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# AMERICAN JOURNAL OF PHOTOGRAPHY

AN ILLUSTRATED MONTHLY  
DEVOTED TO PHOTOGRAPHY IN ITS  
WIDEST SENSE

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AMERICAN JOURNAL OF PHOTOGRAPHY,  
NOVEMBER, 1895.



A SCENE IN ROTTERDAM.

NEGATIVE ON STANLY PLATE.  
MADE WITH GUNDLACH LENS AND SHUTTER.

# AMERICAN JOURNAL OF PHOTOGRAPHY

THOS. H. McCOLLIN, Managing Editor.

JULIUS F. SACHSE, Editor.

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## COLOR (?) PHOTOGRAPHY.

AMONG the hackneyed subjects that form the stock in trade of the sensational journalism of the present day, none is more frequently called upon for duty than the announcement that color photography is now an accomplished fact, and that Mr So-and-So or Dr. This-and-That lately demonstrated the fact before the Solar Tripod Club, or that Professor Gotitall was awarded a premium of a million lire for his experiments before the Imperial Academy, and so on. It is always the same old story, only that the names and locality are varied occasionally. So common has the announcement become of late, especially in the "Sunday papers," that persons who have any knowledge of photography pass it over without further notice.

As a general rule the photographic press both at home and abroad has handled these periodical announcements with great discretion and care so as not to mislead the general public.

During the past month, however, an exception has been noted, and strange to say it appeared in our esteemed contemporary, the staid Anthony's *Bulletin*, wherein we are told among other things that :

"The dream of Daguerre is at last realized. Both he and his partner-inventor, Nicephore Niepce, wasted the best portion of

their lives in the vain endeavor to fix the beautiful colors of nature seen on the ground-glass of the camera. . . . The problem has at last been solved, and what was considered impossible but so few years ago, is now in practical use."

Now this startling announcement certainly sounds very well, but who is the inventor and where are specimens to be seen. Has a company been formed as yet to work the process commercially; if so, where can any stock be had and at what figure? Would the inventors or controllers of the process be willing to let a few members of the photographic press in on the ground floor? All of which are pertinent questions in view of the great value of the heralded discovery. Personally, we would like to "catch on" and get in before the door closes, as we have a family dependent upon us, and the winter is close at hand.

During war times, way back in the sixties, whenever a startling announcement of a victory was made, conservative papers would supplement their head-lines with one less prominent, "*Important if true.*" The same applies to the announcement made by our esteemed contemporary.

Now what are the facts of the case? How much foundation is there in the above positive statement? Not a particle, so far as the solving of the color problem is concerned.

As a matter of fact we are as far from solving the problem of color photography (or, to be properly understood, the permanent fixation of the image as it appears in its concentrated color on the focusing screen) as we were the first day when Daguerre demonstrated his process, on August 19th, 1839. Now why deliberately attempt to deceive the public? A photographic periodical should be the last to stoop to such unwarranted statements.

Thus far the color problem has not been solved. It appears just as impossible as it ever was, nor is it in practical use, as stated in the *Bulletin*.

Triple projections by aid of a lantern are by no means "color photography," and even in the best of these the colors are a great way "off," and it is a disputed question whether the same view can be projected twice in succession with the same shadings of

color. Then the triple impressions made with three tints on the printing press is certainly not "color photography." It is chromo-typography pure and simple, no matter what fancy name is given to it. Then again there are certain difficulties that present themselves to the color printer with our present inks that are hard to overcome. No matter how great care is taken, either in the preliminary photographic work or in the presswork, so uncertain and accidental are the results obtained by this three color process, that according to the best judges, only about *one* out of a thousand impressions,\* meets all the requirements of a faithful reproduction of the original colors. This is apparent in the specimen which forms the frontispiece to the current number of the *Bulletin*. It is a pretty chromo, but the cow with a purple face is certainly not in the colors of nature, and yet, so far as the photographic part is concerned, the writer knows of no one who can surpass Mr. Stewart at making the preparatory triple negatives.

This specimen we acknowledge is as fair a one as can be made with half-tone plates and triple impressions, yet it falls far short of the chromo-lithographs such as Prang's, which are produced without the aid of photography.

A few words on the Lippmann process. Interesting as his results may be to the scientist, plates that have to be viewed through a prism to obtain any idea of color, and then either complementary or inferential, is by no means color photography. A diligent search by the writer in Paris, London, and Germany failed to bring to light either a specimen or even a living witness who was willing to declare that he had seen a "Lippmann" specimen that came anywhere near fulfilling the requirements of color photography.

No; the color problem is by no means solved, nor is the solution of the problem even in sight.

JULIUS F. SACHSE.

\**Photographisches Archiv*, No. 774, p. 280.

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**Fans.**—As far back as 1235 B.C. the fan was familiar to the Persians, Assyrians and Egyptians, but these were huge, heavy affairs, born by two or more slaves, and often served as battle standards.

## RECENT PROGRESS IN OPTICS.\*

W. LE CONTE STEVENS.

THE reviewer who aspires to give an account of recent progress in any department of science is met at the outset by two causes for embarrassment. What beginning shall be selected for developments called recent? What developments shall be selected for discussion from the mass of investigations to which his attention has been called? So rapidly is the army of workers increasing, and so numerous are the journals in which their work is recorded, that the effort to keep up with even half of them is hopeless; or, to borrow a simile employed by the late Professor Huxley, "We are in the case of Tarpeia, who opened the gates of the Roman citadel to the Sabines, and was crushed under the weight of the reward bestowed upon her."

I have selected a single branch of physics, but one which can scarcely be treated rigorously as single. From the physical standpoint, optics includes those phenomena which are presented by ether vibrations within such narrow limits of wave-length as can affect the sense of sight. But these waves can scarcely be studied except in connection with those of shorter and of longer period. Whatever may be the instruments employed, the last one of the series through which information is carried to the brain is the eye. The physicist may fall into error by faulty use of his mathematics, but faulty use of the senses is a danger at least equally frequent. Physiological optics has of late become transferred in large measure to the domain of the psychologist, but he in turn has adopted many of the instruments as well as the methods of the physicist.

The two cannot afford to part company. If I feel particularly friendly to the psychologist, more so than can be accounted for by devotion to pure physics, it may be fair to plead the influence of old association. If I am known at all in the scientific world, the introduction was accomplished through the medium of physiological optics. But, with the limitations imposed, it is not

\* Read, August 29th, before the American Association for the Advancement of Science.

possible even to do justice to all who have done good work in optics. If prominence is assigned to the work of Americans, it is not necessary to emphasize that this Association is made up of Americans, but with full recognition of the greater spread of devotion to pure science in Europe, of the extreme utilitarian spirit that causes the value of nearly every piece of work in America to be measured in dollars, we are still able to present work that has challenged the admiration of Europe, that has brought European medals to American hands, that has been done with absolute disregard of monetary standards; work that has been recognized, even more in Europe than in America, as producing definite and important additions to the sum of human knowledge.

In drawing attention to some of this work it will be a pleasant duty to recognize also some that has been done beyond the Atlantic; to remember that science is cosmopolitan. The starting point is necessarily arbitrary, for an investigation may last many years and yet be incomplete. To note recent progress it may be important to recall what is no longer recent.

*Light-Waves as Standards of Length.*—You are, therefore, invited to recall the subject of an address to which we listened in this section at the Cleveland meeting in 1888, when Michelson presented his "Plea for Light-Waves." In this he described the interferential comparer, an instrument developed from the refractometer of Jamin and Mascart, and discussed several problems which seemed capable of solution by its use. In conjunction with Morley, he had already used it in an inquiry as to the relative motion of the earth and the luminiferous ether, and these two physicists together worked out an elaborate series of preliminary experiments, with a view to the standardizing of a metric unit of length in terms of the wave-length of sodium light. By use of a Rowland diffraction grating, Bell had determined the sodium wave-length with an error estimated to be not in excess of one part in two hundred thousand. Could this degree of accuracy be surpassed? If so, it must be not so much by increased care in measurement as by increase of delicacy in the means employed. The principle applied in the use of the interferential comparer is

simple enough ; the mode of application cannot be clearly indicated without a diagram, but probably all physicists have seen this diagram, for it was first brought out eight years ago. By interference of beams of light, reflected and transmitted by a plate of plane-parallel optical glass, and then reflected back by two mirrors appropriately placed, fringes are caught in an observing telescope. One of the mirrors is movable in front of a micrometer screw, whose motion causes these fringes to move across the telescopic field. If the light be absolutely homogeneous, the determination consists in the measurement of the distance through which the movable mirror is pushed parallel to itself, and the counting of the number of fringes which pass a given point in the field of view.

According to the theory of interference, the difference of path between the distances from one face of the plate to the two mirrors should be small ; beyond a certain limit interference phenomena vanish, and this limit is smaller in proportion as the light is more complex. In the case of approximately homogeneous light there are periodic variations of distinctness in the fringes. For example, assume sodium light, which in the spectroscope is manifested as a pair of yellow lines near together. In the refractometer there are two sets of interference fringes, one due to each of the two slightly different wave-lengths. When the difference of path is very small, or nearly the same for both of these radiation systems, the fringes coincide. The wave-length for one is about one-thousandth less than that for the other. If the difference of path is about five hundred waves, the maximum of brightness for one system falls on a minimum of brightness for the other, and the fringes become faint. They become again bright when the difference of path reaches a thousand wave-lengths. The case is entirely similar to the familiar production of beats by a pair of slightly mistuned forks.

The method of interference thus furnishes through optical beats, a means of detecting radiation differences too minute for resolution by ordinary spectroscopic methods. Spectrum lines are found to be double or multiple when all other means of resolving them fail ; and the difficulty of obtaining truly homo-

geneous light is far greater than was a few years ago supposed. By the new method it becomes possible to map out the relative intensities of the components of a multiple line, their distance apart, and even the variations of intensity within what has for convenience been called a single component. Each of the two sodium lines is itself a double, whose components are separated by an interval about one hundredth of that between the long-known main components; and an interval yet less than one-fifth of this has been detected between some of the components of the green line of mercury. Indeed Michelson deems it quite possible to detect a variation of wave-length corresponding to as little as one ten-thousandth of the interval between the two main sodium lines.

This new-found complexity of radiation, previously thought to be approximately, if not quite, simple, proved to be a temporary barrier to the accomplishment of the plan of using a light-wave as a standard of length. It necessitates careful study of all those chemical elements which give bright lines that had been supposed to be simple. The red line of cadmium has been found the simplest of all those yet examined. The vapor in a rarefied state is held in a vacuum tube through which the electric spark is passed, and under this condition the difference of path for the interfering beams in the refractometer may be a number of centimeters.

*A short intermediate standard*, furnished with a mirror at each end, is now introduced into the comparer and moved by means of the micrometer screw. Its length is thus measured in terms of the cadmium wave-length. A series of intermediate standards, of which the second is double the first, the third double the second, etc., are thus compared, and finally in this way the value of the meter is reached.

The feasibility of this ingenious method having been made apparent, Michelson was honored with an invitation from the International Bureau of Weights and Measures to carry out the measurement at the observatory near Paris with the collaboration of the director, M. Benoit. After many months of labor, results

\* Astro-Astronomy and Physics, February 1894, p. 100.

of extraordinary accuracy were attained. For the red line of cadmium at an air temperature of  $15^{\circ}\text{C}$ ., and pressure of 760 mm. two wholly independent determinations were made. From the first a meter was found equal to 1553162.7 wave-lengths; from the second, 1553164.3 wave-lengths, giving a mean of 1553163.5, the deviation of each result from the mean being very nearly one part in two millions. A determination by Benoit from the first series gave 1553163.6, which differs but one-tenth of a wave-length from the mean of Michelson's measurements.

The direct comparison of the lengths of two meter bars, though not easy, is a simple operation in comparison with the indirect method just described, but does not surpass it in accuracy. Everyone knows that the meter is not an exact sub-multiple of the earth's circumference, and that the determination of its exact value from the seconds pendulum is full of difficulty. It may, perhaps, be said that the optical method is no more absolute than the pendulum method, for no human measurement can be free from error; that there is no possibility of the destruction of the original meter and all certified copies of it; and that there is no proof or probability that molecular changes are gradually producing modification in standards of length. Even if we should grant that for all practical purposes the labor of determining the meter in terms of an unchanging optical standard has been unnecessary, the achievement is a signal scientific triumph, that ranks with the brilliant work of Arago, Fresnel and Regnault. In preparation for it much new truth has been elicited, and light-waves have been shown to carry possibilities of application that Fresnel never suspected.

The physicist is nearly powerless without the aid of those who possess the highest order of mechanical skill. The interferential comparer could never have been utilized for such work as Michelson has done with it, had not Brashear made its optical parts with such an approach to perfection that no error so great as one-twentieth of a wave-length could be found upon the reflecting surfaces. In the conception, mechanical design, and execution, the entire work has been distinctively American.

The interferential refractometer has been used with much skill

by Hallwachs for comparing the variation of refractive index of dilute solutions with variation of concentration. The fact of solution brings about a change of molecular constitution affecting both the electric conductivity and the refractive index; and the changes in optical density are measurable in terms of the number of interference fringes which cross the field of view for a given variation of dilution.

*Luminescence.*—While all work on the visible spectrum is confessedly optical we can no longer make an arbitrary division point and declare that one part of the spectrum belongs to the domain of optics and the other not. Since the days of Brewster and the elder Becquerel fluorescent solutions have enabled us to bring within the domain of optics many wave-lengths that were previously invisible. Stokes's explanation of this as a degradation of energy, quite analogous to the radiation of heat from a surface on which sunlight is shining, has been generally accepted.

But whether the phenomena of fluorescence and phosphorescence are in general physical or chemical, has for the most part remained unknown or at least very uncertain. E. Wiedemann, who suggested the term luminescence to include all such phenomena, has, within the present year, published in conjunction with Schmidt a part of the outcome of an extended investigation undertaken with a view of clearing up these uncertainties. He has shown that it is often possible to distinguish between cases in which the emission of light springs from physical processes and those in which it is due to chemical action, or at least invariably accompanied by this. We have here, as in photography, a transformation of radiant into chemical energy, to which is superadded the re-transformation of chemical into radiant energy of longer period, and this either at the same time or long after the action of the exciting rays. Indeed, between this process and that of photography in colors the analogy is quite striking. What has generally been called phosphorescence is well known to be the effect of oxidation in the case of phosphorus itself, and in that of decaying wood or other organic matter which under certain conditions shines in the dark. Wiedemann has shown that the shining of Balmain's luminous paint and generally

of the sulphides of the alkaline earths, is accompanied with chemical action. A long period of luminosity after the removal of the source renders highly probable the existence of what he now calls chemi-luminescence. A large number of substances, both inorganic and organic, have been examined, both by direct action of light and by the action of Kathode rays in a controllable vacuum tube, through which sparks from a powerful electrical influence machine were passed. Careful examination with appropriate reagents before and after exposure was sufficient to determine whether any chemical change had been produced. Thus the neutral chlorides of sodium and potassium, after being rendered luminous by action of Kathode rays, were thereby reduced to the condition of sub-chloride, so as to give a distinctly alkaline reaction. Many substances, moreover, which manifest no luminescence at ordinary temperatures after exposure, or which do so for only a short time, become distinctly luminescent when warmed. This striking phenomenon is sufficient to warrant the use of a special name, thermo-luminescence. Among such substances may be named the well-known sulphides of the alkaline earths, the haloid salts of the alkali metals, a series of salts of the zinc and alkaline earth groups, various compounds with aluminium and various kinds of glass. Some of these after exposure give intense colors when heated, even after the lapse of days or weeks. That the vibratory motion corresponding to the absorption of luminous energy should maintain itself for so long a time as a mere physical process, is highly improbable if not unparallelled. That it should become locked up, to be subsequently evoked by warming, certainly indicates the storing of chemical energy, just as the storage battery constitutes a chemical accumulator of electrical energy. Other indications that luminescence is as much a chemical as a physical phenomenon are found in the fact that the sudden solution of certain substances is accompanied by the manifestation of light if they have been previously subjected to luminous radiation, but not otherwise; that alteration of color is brought about by such exposure; and that friction or crushing may cause momentary shining in such bodies as sugar.

(To be continued.)

## A PHOTO-MECHANICAL PROCESS FOR PROFESSIONAL OR AMATEUR.

UPON frequent occasions we have been asked what Photo-Mechanical reproduction process offers the least difficulties for the inexperienced photographer and yet is within the reach of any intelligent professional or advanced amateur, and one which will give reasonable assurance of success.

In reply to these inquiries we publish the following practical instruction for a simplified process, which in the hands of careful operators has proved reliable. For the amateur parchmented paper offers the best support for the bichromatized gelatine upon which the process chiefly depends. This is in place of the plate glass or thin sheet metal used in large commercial establishments. Then again it is easier to manipulate, and offers more certain results for small editions.

As there is more or less trouble in coating the parchment with gelatine it is therefore advisable to purchase it ready prepared. The parchment is sensitized by immersion in a 2 per cent. solution of potassium bichromate for two minutes, care being taken to avoid air bells. In winter the time of immersion may be prolonged to three minutes. The temperature of the solution should not exceed 60 deg. F., or the gelatine may become too soft. After sensitizing, the sheet should be drawn, gelatine side down, over the side of the dish to remove excess of solution, and then squeegeed down to a sheet of plate glass previously well dusted with French chalk and dried. In the summer this may be effected by merely leaving it in the dark-room all night, but in the winter it is essential to dry with a gentle heat, and the household oven may be utilized for this purpose when the fire is out, there being enough heat left in the iron to dry the film. When dry the parchment should strip easily from the glass and should have a polished surface of even color and without any crystals showing, which are a sign of drying at too low a temperature. If it is desired to obtain rapid drying, a sensitizing bath of

Potassium bichromate, -	-	-	-	-	2 parts.
Rectified spirit, -	-	-	-	-	30 "
Water, -	-	-	-	-	70 "

may be used.

When dry the tissue is exposed behind the negative, which must previously be provided with a safe edge, and the best material for this purpose is the so-called tinfoil, cut into narrow strips, and mounted on the edges, film side, with starch paste, thin glue, or gum. Beautifully clean, sharp outlines can be obtained with tinfoil. An ordinary printing frame can be used, but it is advisable to pad the back well so as to insure absolute contact, and the india-rubber pads sold for this purpose are the best. The exposure is somewhat long, and a not too bright diffused light necessitating three or four hours' exposure is preferable to a bright light and short exposure. As in all other photographic operations, exposure cannot be taught, it must be learnt; but as some guide, the whole of the image, even to the faintest details of the high lights, should be distinctly visible of a brown color on a bright yellow ground, and as the support is flexible we can easily turn it back to examine the progress of printing. When sufficiently printed the parchment should be removed from the printing frame, the negative laid on one side, and the parchment placed film side down on to a sheet of black velvet or a focusing cloth, and exposed till the image disappears, and the whole becomes a brown tinge. This takes about ten minutes.

The parchment should then be placed in a dish to wash, and it is advisable to support it by the corners, film side down. Our method of working this is to procure two wooden laths, to which the parchment is pinned by the corners with drawing pins, and the laths are then placed on the top of a dish full of water, so that the film is immersed just under the surface of the water. After the film has been allowed to soak for about fifteen minutes, the tap should be set running, or the water changed, and as a general rule the washing must be carried on at least six hours, or until there is absolutely no yellow tint in the gelatine; in fact, if a film is set to wash at night with a very gentle stream of

water from the tap, so that the water is changed, it may be left all night without harm ensuing.

When thoroughly washed, the parchment must be dried, and as it has a great tendency to curl, it should be kept flat by laying weights on the edges. As the parchment has to be stretched in printing it is necessary to cut it considerably larger than the size of the picture; thus for a half-plate a piece about 12 by 10 should be used.

For such as wish to work this process commercially or on a large scale resource must be had to glass plates in place of the parchmentized paper.

The glass should be plate glass, and—for ordinary work up to whole plate—quarter-inch plate, as used for windows, may be employed, and the cheapest places to obtain this are the plate-glass insurance offices, as the salvage from broken windows gives them plenty of odd pieces, which for a few cents they will cut to any desired size. The size chosen must of course be regulated by the size of the press, but 12 by 10 is a fair size for whole-plate work, though even it may be worked down to 9 by 7 when experience has been gained. Two pieces of glass should be bought, as this saves time, as will be seen presently.

The glass must be ground, and for this we require emery. Ordinary knife polish is nothing more than emery, but as this is of comparatively coarse grain it must be *washed*. About a quarter of a pound of emery should be placed in a jug and stirred into a paste with water, and then a pint of water added, the whole stirred well for about five minutes, and allowed to stand for five minutes, and then the liquid carefully poured off from the sediment. The dirty water thus poured off should be allowed to settle for two minutes, and the water again poured off, and then this time the water with the finely-divided emery, which it holds in suspension, should be allowed to settle for twenty-four hours. In this time the whole of the emery practically will have deposited, and the clear water may be poured off as closely as possible, leaving the emery at the bottom of the jug. For those unable or unaccustomed to decant solutions from precipitates, the easiest thing is to obtain some india-rubber tubing such as

used for infants' feeding bottles, and two and a half times the height of the jug should be bought. This tubing should be filled with water at a tap, both ends pinched, and one lowered into the jug till within about an inch of the deposit, and then the other end lowered below the jug, released from pressure, and the water will run off. Obviously a sink or pail should be used to catch the outflowing water.

The paste of emery may now be shaken up and turned out into a gallipot, an old tin, or any handy receptacle. The sheet of glass should now be supported on a firm box or any convenient support in the sink, a teaspoonful of the damp emery should be placed in the middle of it, and the other sheet of glass lowered on to it; and then the upper glass should be moved backwards and forwards, and up and down and in all directions, in circular as well as in straight lines. This must be continued till on being wiped with a damp sponge the surface is uniformly and evenly grained or ground all over. If there are any parts which look polished or less ground than the rest, the operation must be repeated, or if any deep scratches or cuts are visible the emery was too coarse and it must be rewashed, and only the finest used. When the plate is "uniformly greyed" like the very finest focusing screen, the emery may be wiped off with a damp sponge, the plate well washed in water, then in five per cent. solution of ammonia, well washed under the tap, edges back, and all, and wiped with tissue paper till nearly dry, and reared up ground side to the wall to dry.

The sponge used to wipe off the emery should be squeezed out in water and the emery collected, for it is when once used in prime condition for further work.

When quite dry and clean the glass must not be touched with the fingers, at least on the ground side. It requires a substratum, and the best is beer and silicate of soda or water-glass. Bottled beer must not be used; "sour ale" from the nearest public-house should be bought and allowed to stand for a day in a shallow dish—a developing dish or something of that kind. Soda water-glass can be obtained in three conditions—pure, which is too good; a solution, which should not be used, and a

commercial salt, which is one-fifth the price of the pure, and answers our purpose admirably. A ten per cent. solution of this should be made with the beer; the silicate slowly dissolves on stirring, and when dissolved it should be filtered through fine flannel, or better still, nainsook, both of which should be previously well washed.

The glass is now placed in a horizontal position, and sufficient of the beer poured on to it and distributed with a glass rod bent in the form of a triangle, and then the plate reared up to dry in a place free from dust. About 1 oz. to a 12 by 10 piece of glass will be plenty; the solution is cheap, and we need not spare it. As the solution will not keep, only sufficient for the immediate requirements should be mixed, and this is easily effected if the beer is warmed slightly. The coated plate should be left for twenty-four hours to dry, and then given a second coating of beer and silicate. The plate should again be allowed to dry thoroughly; six hours is long enough, when it should be placed in running water to wash for a quarter of an hour, and again dried.

So far we have needed nothing out of the way in the shape of apparatus, but we now come to the drying box. The amateur carpenter may make his own; those unable to handle tools must get one made. The dimensions will, of course, depend on the ultimate size to be worked, but 30 by 20 by 20 in. is a very convenient size, and the box must be supported on legs about 12 in. high. The lid should not be solid, the centre, for about 20 by 10 in., should be left open and covered with black calico inside, nailed close, and fine black cloth outside. To one side should be placed a chemical thermometer—not a very expensive one, as we never want to go above 160 deg. F. The bottom of the box should be fairly stout zinc. Inside the box must be cross shelves, made in lattice work, not solid, yet stout. What is wanted is firm shelves yet plenty of open space for free circulation of air. An ordinary gas or oil stove is also required, a leveling stand and a level; the latter must not be less than 6 in. long, and the brass-mounted levels as used by carpenters are the best.

If we have got the drying box we are now ready for coating the plate.

The sensitive film is bichromated gelatine, and formulæ for its preparation differ considerably; still, we think the following will be found satisfactory.

Considerable difference of opinion exists as to the most suitable quality of gelatine. For commercial work the hardest that can be obtained is preferred, but for amateur work and small runs Creutz's middle hard is the best.

The actual formula is:

Creutz's gelatine,	-	-	-	-	-	380 gr.
Potassium bichromate,	-	-	-	-	-	77 "
Liq. ammonia,	-	-	-	-	-	30 m.
Water,	-	-	-	-	-	20 oz.

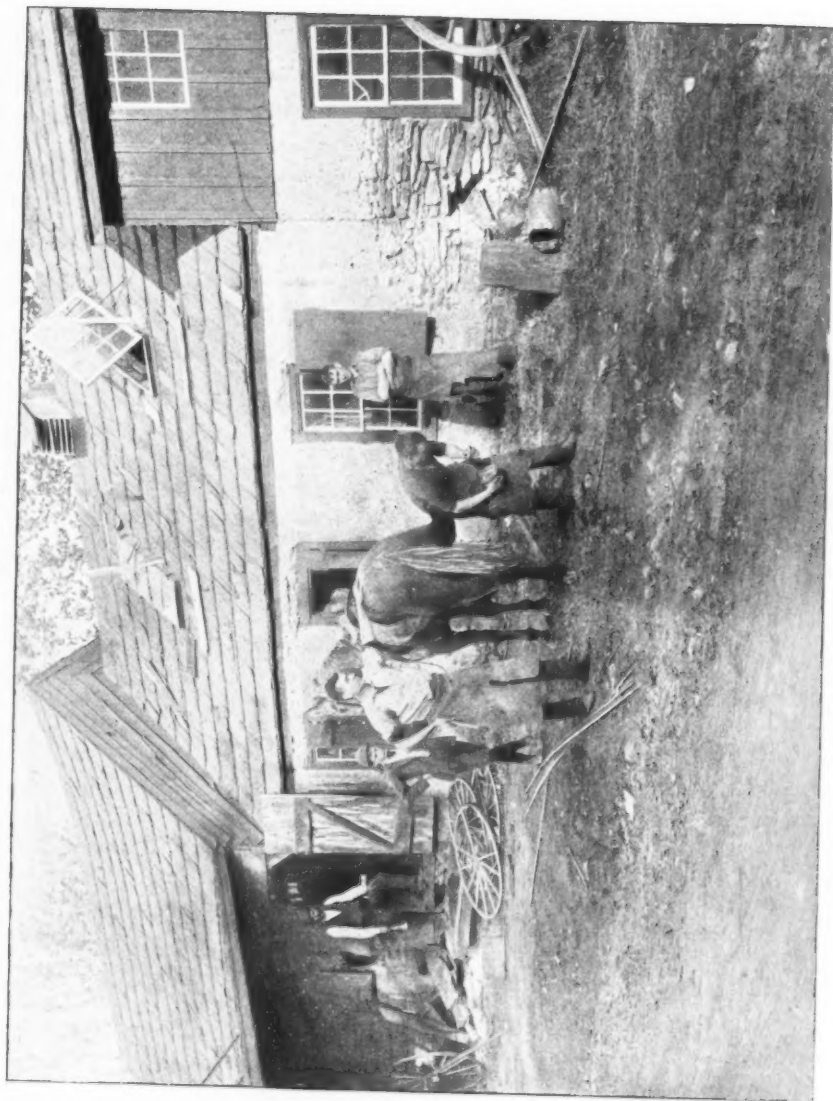
Soak the gelatine in water for an hour, melt by the aid of a water bath, add the bichromate and stir till dissolved, then when cool add the ammonia. Filter the solution through two thicknesses of nainsook, and then pour on to the glass, which should be previously warmed. The solution should be distributed by means of a bent glass rod or a stiff cardboard, and then the plate immediately placed on the leveling screws, and the lid closed and the heat raised to 156 deg. F. for at least two hours, and generally two and a half will be better.

When thoroughly dry, the plate is cooled in the oven and then exposed behind a negative, which must of course be reversed to give the subject the right way round. The exposure can be gauged by an actinometer, but the better way is to judge of the progress of printing by examining the plate through the back, and when all the details in the high lights are visible the exposure may be interrupted and the back of the printing frame removed and the collotype plate exposed through the glass to the action of light. This causes the film to adhere more firmly to the glass, and as a rule gives better prints, as it reduces the relief. The duration of this exposure varies from five minutes in winter to about one or two minutes in summer.

The plate should then be placed in a tank and washed with running water for about six hours, or failing a tank placed face



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A COUNTRY CROSS-ROAD SMITHY.

upwards, resting on the corners on little blocks of wood, and the tap be allowed to run on it for about two hours, and it should then be soaked in water for two hours, the water being frequently changed until the film has lost every trace of yellowness. Then the plate should be drained and adherent water gently dabbed off with a piece of nainsook, the plate placed face to the wall and allowed to be thoroughly dry. This may take five or six hours, but it should not be hurried.

When thoroughly dry it should be laid in a dish for about an hour in a solution of

Water,	-	-	-	-	-	-	-	-	10 oz.
Glycerine,	-	-	-	-	-	-	-	-	20 "
Hyposulphite of soda,	-	-	-	-	-	-	-	-	2 "

At the end of this time the solution should be poured off, the adherent solution removed with a very soft sponge, and then the film dried superficially by gentle pressure of a very soft cloth or some nainsook. It is now ready for inking up.

The preparation of the rollers and ink is a troublesome process, and therefore it is better to purchase these, and they can be obtained from any establishment dealing in lithographers' supplies. A little ink should be spread on a sheet of plate glass with its surface ground, and the roller passed backwards and forwards in all directions till an even film of ink is distributed over the roller and the glass. The roller is then passed slowly and with fairly heavy pressure over the collotype plate, three or four times, till it has taken the ink everywhere. Naturally, the first thought is, what about our high lights? Well, with a little practice these will not cause any trouble, because by quickening the motion of the roller, and using lighter pressure, the same roller which applied the ink will remove it from the high lights. When the image appears in correct tonality against the glass, which should be laid on a sheet of white paper, the plates should be transferred to the ordinary letter-copying press.

First of all, on the bed of the press should be placed a piece of india-rubber about a quarter of an inch thick and at least half an inch larger all around than the plate. Parchment paper cut in strips should then be laid on the plate close up to the margins

of the picture so as to form a mask, and then the plate laid on the india-rubber. A sheet of good paper should now be laid on the inked plate; and over it, without shifting it, should be placed a pad formed of a bag of satin stuffed with cotton wool, and then the top of the press screwed down, when if all has been successfully carried out a fairly good pull will be obtained, and the quality will improve by successive workings.

Of course, the plate has to be inked up after every impression and the masks laid on again, and this may continue till the high lights in the impression are foggy and tinted, when the plate should just be covered with an etching solution composed of—

Water,	-	-	-	-	-	-	1 oz.
Glycerine,	-	-	-	-	-	-	1 "
Ammonia,	-	-	-	-	-	-	5 drops.

This should be allowed to act for about two minutes, and then the solution mopped off with a sponge and the plate dried as before with nainsook and again inked up.

It will be seen that the only requisites beyond the copying-press are a drying oven, thermometer, plate glass, roller, and ink, and these do not require any great outlay. Practice will soon make perfect, and collotype may well be considered a process within the reach of all devotees of the photographic art.

J. FOCUS SNAPPSCHOTTE.

**Cleaning Optical Glasswork.**—Mr. M. Levy states that process screens cannot be satisfactory polished with paper. Chamois is not good on account of the peculiar manner in which dust particles adhere to it. The best thing to use is a piece of white china silk, which has been washed in warm water and all the sizing removed. It is, of course, understood that the screen be kept in a clean cardboard or wooden box, which is used for nothing else. Sometimes the surface of the glass shows a certain haziness, apparently oxidation, and in such case the surface should be carefully and thoroughly polished with the same silk and with a mixture of fine washed rouge and water, and it may be necessary to maintain a brisk rubbing for half-an-hour or more to obtain a brilliant polish on a small space.

## PHOTOGRAPHY IN COMMERCIAL ADVERTISING.

WALTER SCOT.

THE use of photography as a commercial illustrator opens up a comparatively new field, but nevertheless one which might well be afforded a chapter in the history of the development of that science. As applied to pictorial advertising, photography has within the last two or three years advanced to the rank of an art. Fifteen years ago the leading magazines of the times contained scarcely any advertising whatever in their pages outside of their own, and the few illustrations accompanying these consisted principally of wood cuts and stipple engravings,—well executed, stiff and uninteresting. To-day a person, no matter how unfamiliar with the progress of illustrated advertising he may be, need only receive the hint to see at once that the attractiveness of the advertisement pages in a large magazine is mainly owing to photography in one or other of its branches. In making this statement it is not to be supposed that the artistic element essential to good illustrating of any kind is wholly due to the camera; what photography has done was the placing within the reach of all the only cheap and effective medium through which advertisement illustrating could be made available. The successful merchant who employs an advertisement writer, an artist and a process man, can look back on the time, and that not very long since, when pictorial illustrating was unthought of. The demand for richly illustrated magazine literature has within the last ten years invaded the realms of advertising. It has done this with a progress so gradual that the man of '95 cannot realize except by comparing the flat with the attractive and the uninteresting with the entertaining, what a boon photography has really been to his commercial interests. It is not our desire to claim for photography the place occupied by the pen-and-ink artists whose work it copies. The true value of the camera is secondary to that of illustrating as regards the actual artistic side of pictorial reproductions. While the camera has been used to advantage in certain instances as a substitute for freehand illus-

tration, its proper scope is limited to the production of good photographic results.

In looking back over a file of representative magazines as recent as 1888, the advertisement cuts are astonishingly antique in appearance. Out of about one hundred illustrated advertisements in the back pages of a standard magazine of that date, the number of cuts produced by photographic processes does not amount to more than fifteen, the rest being wood-cuts and electrotypes. A year later, in 1889, the only photographic cuts in the same magazine were a couple of phototypes from indifferent drawings and several half tones of negatives and wash drawings. Taking a jump to 1892, photography is seen to have expanded over more than one-half of the advertising space, crowding out stipple work entirely and throwing carefully executed wood-cuts in the shade. In 1893, photography is represented by half-tones of carriages, model homes, infants who have thriven on the best brand of canned food, cameras and photographic views, sporting views, sporting goods and reproductions from free-hand wash-drawings; and pen-and-ink work embraces all kinds of cartoons, architectural sketches, mechanical drawings, etc. In 1894 in the more recent numbers of all the popular magazines it would be difficult to find twenty-five cuts which had not been produced by some photographic means. This brief review of recent illustrated advertisement is only a small portion of the evidence that photography is taking the lead in advertisement lines. The growth of process photography has been co-incident with the artistic demands made by the times, and as an illustrator it has proven, to all commercial purposes, superior to any other method of turning out good cuts at a nominal cost.

Pictorial advertising is not confined to the pages of the magazine or newspaper. It extends to street-car advertising, business cards, pamphlets, catalogues, announcements, and a host of lesser printed matter in the interests of advertisement, all the indirect result of photography and kindred processes. Street-car advertising to-day, with the exception of a few instances, is not complete without the adjunct of illustration. An ordinary pen-and-ink drawing of the most trivial nature, say a scroll or corner design

for a street car placard, cannot reach the public without the assistance of the process man, who by the swift manipulation of a zinc engraving reproduces in type what would have taken the wood engraver of twenty years ago twice as long to do half as well. Most of the color prints in the street cars are made from reproduced sections of the artist's original drawing. As many zinc cuts of the drawing are made as there are colors to be printed, and those parts of the type not to be used are cut out, leaving exposed the section of each block that is to bear color. When all of these process plates have been printed in their respective colors by as many different impressions in the press, the effect is identical with a lithographic print. In photographing an original drawing, the nicest care is requisite to make the negatives exactly alike, so that the whole figure will hang together accurately when the color blocks have been successively placed in the printer's chase. Decorative covers for magazines, to be printed in one or more colors, are sometimes made in the same way. The original design in India ink is copied on a wet plate and transferred to zinc by the usual process, the color blocks being cut apart if the simplicity of the design admits of it. A large percentage of the illustrated pamphlet trade that was formerly the work of engravers is now in the hands of the artist and photographer. Delicate advertisement cards that would deceive an expert in detecting them from engravings are made from the drawings of the skillful pen-and-ink letterer, whose immaculate line work is reduced one-third in the copying, thus sharpening the already clean-cut drawing. To make a show card in two colors the artist first sketches his design and then draws it in completely with ink. The first color-block is made by re-drawing the parts that are to be printed in that color. The design is then carefully measured and its dimensions transferred to another sheet of cardboard. The remaining parts, constituting the second color block, are next drawn, and when finished are handed over to the photographer. Both drawings are tacked up and photographed together to insure their perfect correspondence in size. So accurately can this work be done that an ordinary

printer is able to join the two sections of a fine scroll or border without the variation of a hair's breadth.

Photography has also usurped the steel engraver's as well as the lithographer's art. Line drawings of machinery, furniture, and various mechanical appliances can now be worked up so skillfully with the ruling pen and reproduced by photography that commercial engraving has been considerably depreciated and will in time doubtless be superseded by the newer method.

As an artistic illustrator little as yet can be said of photography, except that its best results are obtained in connection with advertising. Child photography, wash drawings of interiors and figures, and views of tours, about mark the successful limit to which pictorial half-tone has arrived. Cleverness and trickery, as tending to produce the unusual, are as ever the surest guaranty of success in illustrated advertising. The head of a child reproduced in a very coarse half tone is at once interesting because it is a good photograph and interesting because it is not a conventional picture. Photographs of figures, heads or scenery, done in pen-and-ink so that the general resemblance to a photograph is not lost, will attract the attention of a person glancing through the advertising pages of a magazine where an engraving would be passed by without notice. The advertisement of a steamboat line or a tourist train illustrated with wood-cuts is about as worthless as the paper it is printed on. But illustrate either of these by well gotten up half-tones from the actual objects or by clean pen-and-ink drawings over photographs, and you immediately have something that people will look at. It is just such points as these that the commercial advertiser of the day has grasped and is applying successfully in the shape of figure drawings, cartoons, jokes and clever sketches to illustrate bright reading matter. And he is doing this with the assistance of the artistic photographer and the process man instead of the engraver, whose usefulness will soon be a thing of the past.

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**Some** of the best trained choirs manage after all to make a great discord in the church.

## THE COMMERCIAL ASPECTS OF THE HALF-TONE PROCESS.

BY MAX LEVY.

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THE commercial aspect of photo-engraving, and of the half-tone process, is complicated by many elements not usually taken into consideration by those engaged in the work. One of the most striking of these elements is that the photo-engraver buys and sells time, the most perishable of all commodities. Another is that each piece of work is practically a new invention. Then the work is done to the order of a particular person, and is absolutely without value if rejected by him.

The photo-engraver is at the mercy of some printer who may make or unmake his work. The photo-engraver is peculiarly liable to relations with speculators and beats who are working some wild advertising or other publishing scheme, and is dependent for his pay on the success or failure of these schemes.

The work in itself is complicated and troublesome. The results from any given subject may vary within wide limits, and still fulfill the requirements of being a reproduction in a general way. Skill is required, not only in executing the work, but to at least an equal degree in ascertaining what the customer wants, as well as in transmitting the idea to the workmen.

The melancholy fact is that most of the people engaged in the business are workmen with little or no experience in the intricacies of business management, and it is well known that such men are unable to properly measure and consider the elements and cost of conducting business, entirely aside from the actual cost of labor and materials employed in the production. This is generally true of most business affairs; but, in the particular business under consideration this truth applies with especial force, for reasons peculiar to a very limited class of enterprises.

The various elements which contribute to the difficulties of conducting business can be classified, and it will be readily seen that the photo-engraving business includes the maximum of these elements.

The simplest business to conduct (not considering the question of capital) is one in which one single article of a single grade is *bought*, and *sold* at an advance by a monopoly. An increase in the number of articles, or grades of the same article, will complicate the conduct of the business.

The introduction of competition will add further new elements, and so on.

The simplest manufacturing business will, of course, be that in which a single simple article is made in more or less considerable quantities by a single person, and sold by himself to customers who come to him to buy. This simple business will become complicated by any additional factors, and will develop, in the direction of our business, on moderately clear lines, in something like the following order :

First, making a number of different articles, each in quantity, the individuals of each class remaining all alike. In this case the difficulties will increase with the number of kinds and the divergence of their uses, or the class of people with whom one deals.

The next element of difficulty will be increasing complication in the article produced, involving the division of labor and complex manufacturing methods, with attendant expenses of the foreman, designers, etc.—apparently unproductive workers.

Along these lines the greatest enterprises may develop almost indefinitely without encountering fatal obstacles ; but following this comes a complication of another class, and the addition of this complication immediately makes a sharp line of demarcation, beyond which the difficulties and expense of conducting business are of a totally different class. This element is the making of work to the order of the customer instead of for a general market.

This factor immediately limits the growth (excepting in rare instances of large undertakings, like house and ship-building, very large machinery, etc.). Take, for example, the cases of the shoemaker and the shoe manufacturer. While the business of manufacturing shoes for sale may be conducted on almost any scale, the mere suggestion of 50 or 100 men in the business of making shoes to order is almost enough to drive one frantic. It

is needless to carry this line of development to its final conclusion, but it will be seen from the facts stated at the beginning that the photo-engraving business includes a maximum of the elements which go to make a business difficult to conduct, and make the real cost of the total production so entirely disproportionate to the apparent cost of each piece of work.

A man who has been foreman or superintendent in some establishment, and wants to start for himself, is apt to figure something like this: "Here am I, Tom, and Dick, and Harry. We are all experienced in this work, and we are really the life of the ——— Company's business, and are giving our valuable services for ——— dollars per week. I can make so many negatives a day, Dick can print and etch them, and Harry can finish and prove them all easily; and it can't help but work smoothly, and — 'there you are!' We'll each make twice as much as we do now, be 'our own bosses,' and have a fine time. Capital? Oh, Dick has filled John Smith with the idea of the big money there is in it, and he will put up a thousand dollars to start the thing." To begin with, and before doing any work, orders must be obtained, and this will take someone's time, and be an expense. These orders must be intelligently received, must be duly and properly entered in a record, and some written shop memoranda made up to accompany the work in its progress to completion. If this preliminary work is not done in a careful and thorough manner, the job will present difficulties at every turn, and may be useless when finished. Assuming that the preliminary work has been properly done (and this is making a big allowance, under the circumstances), the work goes to the camera. An exposure is made; it happens to be a little over or under-exposed, the high-lights are too dense, and the negative has a spot here and a flaw there. The question arises, Is this good enough? Can't the etcher bring this up, or hold that back? Can't the finisher lighten here, or burnish there? It is finally concluded to "let it pass," as it's already late and the job must be done to-day or to-morrow, as the case may be. Several jobs go through; one requires two, three or four negatives before it will pass; and another the same number of prints, and after a slip here and a

slip there, and one plate damaged by one accident, and a negative broken by another, we have our plates ready for the proofs. These are made, and some are considered good, some better, and some indifferent. They are ready for shipment or presentation to the customer. The work is packed up carefully, and, with proofs and originals, is delivered. It must be charged on the books, invoice made, etc.

Now comes Mr. Jones, the customer: "Why, Mr. Tom, don't you remember I said I wanted this figure darker, that mustache trimmed off a little, this squint eye corrected, and in this wash-drawing here you have lost all that fine little detail in the dress that I told you I was so particular about, etc., etc." To take Mr. Jones at this stage of the transaction and send him away smiling and satisfied will require a tact and training which is almost impossible to obtain in the "shop," but can only be developed by office practice.

When work is finally finished, it is not an end attained; the photo-engraver's work is only a means. The printer's aid is required to finish it, and alas! how often he does "finish" it, and photo-engraver along with it. But how can he help it? He has, in all probability, been obliged to "hustle" it; to use poor paper or poor ink, or to do the entire work too cheaply; but the blame, most commonly, will be found to rest with the "poor plates. They are too shallow, improperly blocked, or what not, and you know I advised you to go to so-and-so; their blocks always print well." When our engraver sees the impression, he is likely to tell Jones that so-and-so "don't know how to print a half-tone; he may be able to print a poster, but we never saw a half-tone printed by them that was any good;" and so Jones' scheme doesn't "pan out," and he is convinced that if the engraver and printer had done their work anywhere near properly, his was the greatest scheme of the time. The final upshot is that he can't pay, or don't pay, or pays half the account as settlement in full, after weeks of dunning. Meantime, there have been times when there was not much to do, and expenses ran on just the same, and by the end of the year a balance is drawn, and what does it show?

DR.

CR.

Wages.

Mdse. Sales.

Rent.

Expense.

Wear and tear.

Salary of proprietors.

Profit and loss.

Material.

Interest and discounts.

Balance—most likely a minus quantity !

**Ways of Druggists.**—"I noticed," said the druggist, to his assistant, "that a gentleman came in with a prescription, and that you took it and gave him the stuff in about three minutes. What do you mean by that?" "It was only a little carbolic acid and water," replied the assistant. "I simply had to pour a few drams of acid into the bottle, and fill it up with water." "Never mind if you had only to do that," the druggist declared. "Don't you know that every prescription must take at least half an hour to fill, or the customer will think he isn't getting anything for his money? When a prescription for salt and water or peppermint and cough syrup is handed to you, you must look at it doubtfully, as if it were very hard to make up. Then you must bring it to me, and we will both read it and shake our heads. After that you go back to the client and ask him if he wants it to-day. When he says he does you answer that you'll make a special effort. Now, then, a patient appreciates a prescription like that that he's had so much trouble over, and when he takes it he derives some benefit from it. But don't you do any more of that three-minute prescription business, my boy, if you wish to become a first-class druggist."

**Mr. Joseph Lindon Smith**, the Boston artist, has completed his decorations for the walls of the new public library in Boston. The work is described as of a more modern character than that of Chavannes, Sargent or Abbey, but it is, in its way, most satisfactory. The subject represented by Mr. Smith is the city of Venice and her Oriental commerce and connections, the source of her wealth in the middle ages.

## A SCRAP OF PHOTOGRAPHIC HISTORY.

THE association of Dr. Adolf Miethe, the well-known photo-scientist, with the Voigtländer optical establishment at Braunschweig, Germany, as mentioned in our last number, recalls to our mind an old yellowed manuscript filed away among our photographic records. It is in the handwriting of William Langenheim, who will be recalled as one of the pioneer heliographers in America.

The subject is a memoir of the Voigtländer family, more especially, however, of Frederick William von Voigtländer, who it will be remembered constructed the first perfect portrait objective according to the calculations of Prof. Petzval, of Vienna.\*

As the output of the great optical establishment is known to almost every photographer, this scrap of personal history will prove of general interest to the photographic field at large, more especially as it was originally written by one of America's pioneer photographers.

## FREDERICK VON VOIGTLÄNDER.

It is not unreasonable to believe that certain talents are hereditary in some families, and that the nobility of industry is committed to posterity as well as that of genius.

Riehl tells us that in the year 1848, when the faith in mental hereditary faculties was at its lowest ebb on the continent, the pedigree of Sebastian Bach was investigated, and quite a series of musical celebrities were found amongst his ancestors.

In the same manner the Voigtländer family present a line of German opticians whose works have been honorably mentioned wherever known for more than a century.

The great-grandfather of the present representative [1895.—Ed.] of the firm of Voigtländer and Sohn was the inventor and maker of certain excellent mathematical instruments, as far back as the year 1756, which are said to be in use even down to the present day, while the father of the subject of this sketch, W. Voigtländer, was the inventor of the biocular and field glass, together with several other optical and technical instruments.

\* Fr. Voigtlander und Sohn in Wien und Braunschweig.

His maternal grandfather, Tiedeman in Stuttgart, during his time was the most celebrated optician in Germany, whose apparatus, particularly his telescopes, were considered to be equal if not superior to those of Dollond and Ramsden.

The subject of our sketch, Baron Frederick William Voigtländer, was born at Vienna in 1812, and after finishing his studies at school, he received from his father the first rudiments of prac-



FREDERICK VON VOIGTLÄNDER.

tical instruction. The lad prosecuted his higher studies at the Imperial Polytechnic Institute at Vienna, and afterwards spent several years in Germany, France, and England, as was then customary, for the purpose of extending the scope of his knowledge.

In 1835 he was admitted into the paternal establishment, when he adopted Fraunhofer as his ideal, and endeavored to increase his theoretical and practical knowledge. He occupied himself prin-

cipally with the determination of the refracting and dispersing powers of the various kinds of flint and crown glass, and constructed an apparatus wherewith he could produce any given curvature up to 0.0005, etc., for use in work of large dimensions. This was after he had constructed a number of smaller telescopes, which astronomers like Stampfer, Schumacher, and Gaus, acknowledged were in some particulars superior even to those made by Fraunhofer.

In the year 1840 he became acquainted with Prof. Petzval, and according to the latter's computations, constructed the first photographic objective suitable for portraiture; Voigtländer supplying the indices of refraction and dispersion of the glass used.

Upon the construction of this original photographic objective rests the entire structure of photography of the present time [*i.e.*, at the time of writing], and takes its date. Optics then had to surmount the difficulties which were caused by the lack of sensitiveness of the materials employed, and the intermediate steps to the sensitive collodion would have been impossible.

What use would the triplets, periscopes, globulars, and others have been at that time, when it was barely possible to take a picture with the rapid-working combinations of Petzval? The former have come into use only since the chemical branch of photography has been brought to the present state of perfection, just as the steel pen became practical only subsequent to the introduction of machine-wove paper.

Voigtländer (F. W.) has never overestimated the part he took in the invention of the original portrait objective, and on this account it is our duty to emphasize still more the fact that he undertook the execution of Petzval's formula with a degree of practical knowledge, energy, and honesty, commensurate with the importance of the invention, which was destined to establish his reputation throughout the civilized world.

The attendant success soon required the erection of an additional establishment, which he located at Braunschweig, the home of the family of his wife.\*

After the introduction of the Petzval lens the growth of

\* Baron F. von Voigtländer was married to Nanny Langenheim in 1845, the sister of the brothers, Frederick and William Langenheim, the Philadelphia heliographers.

heliography was rapid beyond all expectation. Vienna at that time, considering its geographical situation, could hardly hope to become the central point of an industry destined to hold both France and England in comparative vassalage, and it is this doubtful point that may have been the true reason why Voigtländer and Petzval never entered into any precise business compact, and which would have secured to the photographic world their personal co-operation for the future, and prevented the bitter feud between the two men in after years.

It was after a lapse of seventeen years, when Prof. Petzval brought out his orthoscope lens, that Voigtländer asserted in a memoir to the Academy of Sciences of Vienna and a printed pamphlet, that Prof. Petzval had given him the computations for his orthoscopic lens when they still worked in harmony. This was denied by Petzval; thus the bitterest enmity was engendered between the two scientists, resulting in legal proceedings and suits about patent rights, making all overtures at any compromise hopeless.

In the meantime other nations came to the fore, and new forms and types of objectives were introduced by the English and American inventors, such as the triplet combinations and the globular arrangements, which had a depressing influence on the older type, and it was not long when all that remained of the Voigtländer-Petzval type were the euryscope and orthoscope.

For portrait work, however, nothing was introduced superior to the original Voigtlander-Petzval (euryscope) objective. This lens maintained its superiority in America as well as Europe, and great were the festivities in the old city of Brunswick when the first 10,000th objective was constructed.\*

Referring once more to the unfortunate Voigtländer-Petzval feud, Bollmann, in his *Monthly Photographic Magazine*, published at the time, states:

It is indeed a matter of regret that the two above-named prominent men co-operated for so short a time only, and finally drifted into open hostilities. If fate should have ordained otherwise, and willed that these two highly-gifted persons should

\* There is no date given in the old MSS. as to when this celebration took place.

have remained together and continued their researches jointly, perhaps we would have obtained still greater achievements in science in general, and our own art science in particular, which by their estrangement has remained dormant for the time being.

The pamphlet of Mr. Voigtländer, continues Bollmann, induces reflection replete with emotion, and we believe that he as well as Prof. Petzval sincerely deplore the interruption of their combined labors. Deplorable, however, as this unfortunate disagreement may be, it is still a fact that at all events we have reason to be grateful and rejoice that we have such men in our midst.

The two establishments at Vienna\* and Brunswick employ about eighty workmen, and at the latter establishment the instruments are made in a regular factory, which however does not interfere with their being finished in a manner adequate to the highest scientific and artistic requirements.

A steam engine facilitates the labor, and two glass furnaces are employed, in which the French and English glass is remodeled.

In person F. W. von Voigtländer was highly interesting. His tall figure, florid complexion, long reddish beard, and high forehead combined to give the impression of manly vigor and superiority. He was noted for his piercing look, the rapidity of his perception, and his clear reasoning powers. He was conversant with most all modern languages, speaking them fluently; he was also a musician of unusual excellence.

His attainments in the field of photographic optics were recognized not only by the various scientific societies, but by different rulers as well. The Emperor of Austria created him a member of the hereditary nobility of the Empire; the Duke of Brunswick named him a "Councillor of Commerce." He was also dubbed a Knight of the Franz Joseph Order, and of various other Prussian, Italian, Mexican, and Hessian orders.

The above account, written as it was almost half a century ago,

\* The Vienna establishment was relinquished partly by the death of the business manager, partly by other circumstances. When the establishment was finally removed to Brunswick pensions were assigned to many of the old workmen, their widows and families.

forms an interesting contribution to our photographic history. It would indeed be interesting to know how many photographic objectives of the euryscope type the Voigtländer firm has turned out to date, the establishment being still in the family, the business having descended to F. von Voigtländer, the son of the subject of the above sketch after his death in April, 1878.

J. F. SACHSE.

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**The Benefits of Hard Times.**—The benefit of the recent hard times has been to expose the iniquity of many undertakings of the second and third class. Whether the warning will last beyond a few years is doubtful. In each generation will be found a body of men of a plausible and to some extent able type whose moral sense is obtuse, and who have no sense of wrong in promoting these speculative patent bubbles or inflated "industrials," as they are called; while on the other hand, each generation produces its proportion of those who are ready to be fleeced in their effort to make something out of nothing. Such dupes are very apt to be the descendants of men who have penuriously and laboriously piled up wealth, but whose children, "not having been brought under the healthy stimulus of prospective necessity, and for whom nothing else has been provided," lose the property with which they have been charged. In many cases this method of distribution works a benefit to the community. The property passes from the hands of those who have proved to be incapable of making a good use of it, while they themselves are sometimes developed into active and useful persons under the pressure of the need of working which they have brought upon themselves in their effort to live on profits made at the cost of other people's losses. Hence the benefit of hard times will presently be further developed under this law, to the end that those who take over to themselves the specific titles of the "working people" of this country will secure to their own use and enjoyment a larger share of an increasing product than they ever attained before; being already in the enjoyment of the largest share of the most abundant product as compared to all other nations in the so called civilized world. What may be the effect of these progressive conditions of increasing welfare upon a country which is now the lightest taxed for national purposes of any machine-using nation, the future only can tell.—*Edward Atkinson, in the September Forum.*

## BICHROMATE DISEASE.

THE injurious action of the alkaline bichromates on the skins of some persons has of late attracted attention both in Germany and America, but unfortunately without anything new or of value being elicited on the subject, or any efficacious remedy being suggested. The description of the disease as given in some of the foreign journals is not, however, quite in unison with that expressed by those who have given attention to the subject in this country, one of whom is Dr. B. H. Richardson. In cases which have come under our immediate notice, and they have been several, the disease has not extended beyond those portions of the body that have been in constant contact with the solutions, the hands and arms. It is generally considered by those who have suffered from the malady, that a strong cold solution of the bichromate is less harmful than is a very dilute hot one; that there is less risk, for example, in sensitising the paper than there is in developing the image with hot water. Opinions are all agreed that the only cure for the disease is to prevent further contact with the salt, and nature will quickly work the cure. As an ameliorative of the intense itching of the affected parts, a lotion containing carbolic acid is again recommended. Many years ago we mentioned that a dilute solution of carbolic acid, in spirits of wine and a little glycerine, was the best allayer of the virulent irritation that has been published. It was given in the *Asclepiad* ten or eleven years back.

It is a singular fact that the bichromate has no effect on some persons, while may suffer after only a few weeks' employment of it. We have in our mind just now two gentlemen who have worked with the bichromate for several hours daily for more than twenty years, and they have never suffered the slightest inconvenience therefrom. We may add, for the information of those who only use the bichromate occasionally, or in an amateur way, that we have never heard of an authenticated case where ill effects were experienced until after several weeks' constant use of the salt.—*The British Journal of Photography.*

**Some Ways of Photographers.**—When the photographer handed the finished product to his customer, he remarked: "Won't you please allow me to put your portrait in our showcase outside the door? It's really one of the prettiest pictures I ever saw, and it will help us in our business to have it seen." "You think it good?" said the young woman, simpering. "Splendid," was the reply. "A gentleman was in here this morning, one of our high-toned leaders of society. He saw the photograph on the counter, and was so struck by it that he offered \$5 for it; but of course I could not sell it. Then he offered me \$5 to tell him who it was." "He-he-he!" giggled the young thing. "Well, I suppose I'll have to let you put it in the showcase; only you don't think people will think I'm nervy, do you, to have so much publicity?" "Oh, no, indeed. Some of our most prominent citizens would give their eyes to be in our showcase. I'm really very much obliged to you for your kind consent. But don't you think you'd like another dozen pictures?" "Better make it two dozen more," said the young thing, "since they're so good. Here's the money." When she had gone the photographer burst out laughing, and said: "That's the 'showcase gag,' and it generally lands them. They think they must be beauties for us to want to put them in our showcase, and they order more pictures. We do put them in the window for a little while, but they soon make room for the picture of some other victim. If they don't order more photographs they don't go in at all, however much we may have begged them for permission. Another 'gag' is this: After we have photographed a lady, we say to her, 'I should so much like to make a portrait of you in evening dress. You have such a beautiful figure.' That works eight cases out of ten, but the showcase 'gag' succeeds nineteen times out of twenty. By the way," he added, suddenly forgetting himself, "don't you want to let me put your photograph in our showcase. It"—but he paused and blushed guiltily. "No," answered the caller, who was a fat man with a lean chest; "but sometime when I'm up here you can take me in evening dress. I'm such a good figure, you know——" But the photographer had vanished into the dark-room.  
—*N. Y. Herald.*

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**A lie** can never be made to fit a truth. Like the philosophy of the man who said the earth rested on a rock, and the rock on another rock, and so on "all the way down," so one lie must rest on another, and that on another all the way down. Yes, down to the very abyss, where reigns the father of lies.

**How He Took It.**—A. L. Eidemiller, assistant city ticket agent of the Burlington, Iowa, enjoys the rare distinction of having made a photograph which suggested the title and theme of the popular song, "Won't You Come to My Tea-party?" A half-tone reproduction of it is found on the title page of each copy of the song, and it has been much admired by those who can appreciate a photograph's technical points. A little girl is pouring a cup of tea for a boy who holds the cup in his chubby hand and watches the process with the greatest interest. The picture is so lifelike, so characteristic of children, and so exquisite in its finish that it seems almost impossible to believe that the pose was the result of study and design. Poses for photographs are generally such stiff affairs, and have such a made-to-order look that one which catches that natural grace so much desired is indeed a curiosity. Many have supposed that the picture was a snap-shot at an accidental pose. A short talk with Mr. Eidemiller to-day, however, shows that every little effect was studied out carefully. The snap-shot effect, which has been commented upon, is a high compliment to the unaffected grouping and expression finally obtained. "A good many people," said Mr. Eidemiller, "have asked me how I obtained such a successful result. You see I have a passion for amateur photography, and you may say that my specialty is children. I am always making photographs of my little son. A lady, a friend of my wife's, saw some of my work and asked me to try my hand on her little daughter. I consented, and one afternoon she brought the child to my house and I took a good many pictures of her. After that it occurred to me to take the two children together. After many trials, I got them together at a little tea-table, and they became so interested in their party that they almost forgot their photographs were being taken. After two hours' trial, I caught them in the right position, and the picture so much admired was the result. Some time ago I showed the photograph to A. H. Fitz, the well-known local song writer, who is a friend of mine, and he immediately asked me if I wouldn't let him use the title and the picture for a song on the same subject. I consented, and he at once wrote the song which is becoming so popular."

**The** jury selected to award the prizes at the International Fine Arts Exhibition in Rome included the following art critics: Julius Lange, of Copenhagen; Richard Muther, of Munich; William Michael Rossetti, of London; Robert de la Sizerande, of Paris, and Adolfo Venturi, of Rome. The jury will award nine prizes of a total value of 42,000 francs.

**Drawing for the Half-Tone Process.**—I have been asked to say something about drawing for the half-tone process. Now the best way to draw for any process is to draw the way you can draw easiest and best. If the work is important the process can be adapted to the drawing. One is limited to the method of reproduction sometimes to certain materials. Thus the photo-type limits us to pen and ink. Well, use any ink thoroughly black, and any pen you choose. I have found Gillott's mapping-pens very good. They are flexible and fine, and produce sharp or coarse lines. There is a foolish prejudice against a broken line; it is termed a rotten line. It is a prejudice similar to that against white lining in wood-engraving or the use of body color in water color. A drawing made on Whatman paper is sometimes broken in its lines, and when rightly managed this is a source of great effect. The engraver looks at your drawing from his standpoint only. This standpoint will not be that of the public. For the half-tone process I should use as smooth a paper as I could work well. The technical difficulties increase with the smoothness of the paper. Whatman's cold pressed is a perfect paper for large drawings. Mounted on cardboard it is more easily and conveniently managed. Steinbach paper is a good smooth paper. For a pigment I prefer ivory black. Charcoal gray is excellent if you can work with great promptness, with a touch and leave it. It will not bear manipulation. It does not enter the grain of the paper, but floats on its surface and washes up badly. It is the least serviceable on bristol boards and smooth papers. It has, besides, another objection. It is extremely beautiful itself, its tone and quality delicious; but all drawings after reproduction are reduced to one level—printer's ink. So you see its quality and tone will only deceive you. Almost any drawing looks well when done in this medium, if it is promptly done. The great virtue of charcoal gray is that it photographs well. If you wish you may use body color or you may combine it with your transparent color. This requires skill. The technical objection is that you disturb the photographic values, as a rule. This may be overcome by the use of orthochromatic plates by the engraver. There is no reason why you should not use charcoal itself. It photographs perfectly, and is amenable to all sorts of manipulation. If your drawings are to be engraved, I believe it better to make them of the same size as the reproduction. Lead pencil is as good a medium as any, and with that you may use smooth paper with a slight tooth. In whatever you do remember the race is not always to the swift. Do not be discouraged, and have patience.

*Edmund H. Garrett, in The American Bookmaker.*

**Photo-Process vs. Xylography.**—In a very able paper, which appears in the current number of *The Independent*, Mr. John P. Davis vigorously opposes the suggestion that wood engraving is about to die, an old art about to be lost. Passing over numberless articles that bewail the "passing of the art," Mr. Davis endeavors more particularly to controvert the affirmative utterances of Mr. A. V. S. Anthony, because coming from an expert engraver of conspicuous excellence. "Consider," says Mr. Davis, "the standard achieved by the art of wood engraving; the world's precious things which have been enshrined by it; its own wealth of art; the men whose lives were spent in its development—Bewick, Nesbit, Thompson, Linton and the Doré school of French engravers—passing in silence (as ground for dispute) all that has been done since throughout the world, in its upbuilding, until it has become in the highest degree sensitive to the requirements of the most exalted forms of art, for the translation into the popular vernacular of black and white! Now," asks Mr. Davis, "what is there inherent in 'half-tone process' which should make it a permanent menace to an art deserving such a description? Scarcely an appreciable improvement has been made in the production of the 'process' itself, and the publisher has not found the cheapness which tempted to the use of 'process' an unmixed blessing. Among influences apart from business probabilities which have sustained wood engraving during the severe trial through which it is passing are exhibitions of such original art work as that shown by Kruell, Kingsley, French, Bernstrom, King and Aikman. The exhibition of the International Society of Wood Engravers of London, with the strong backing given the organization by Hubert Herkomer, R. A., and the Society of American Wood Engravers, which was accorded so prominent a place at the Columbian Exposition, and which, upon the urgent request of Director General of the Berlin Royal Museum, Herr Schöne, is being exhibited in the various art centres of Germany and Austria." Mr. Davis concludes his paper by saying: "When good times shall come again, so that the publisher of fine art works becomes assured that his own be not among the lost vocations, be sure his chief dependence will be, as of yore, upon the faithful handmaidenly art of wood engraving."

**A telescope** costing \$500,000 is an object of interest that Paris hopes to present to the world at the Exposition of 1900. It may enable heavenly objects to be seen that are no larger than the towers of the Brooklyn Bridge.

### **The Editorial Dropshutter.**

**W. H. Jackson**, the photographer who is now travelling around the world making views for the Field Columbia Museum, wires from Shanghai, China, under date of August 27th of 1895: The photographic part of the outfit of the World's Transportation Commission has been provided on a generous scale. Beside my own, a whole plate camera, we have a No. 5 Folding and No. 4 Junior Eastman outfit. These have been handled almost exclusively by Mr. Winchell and Mr. Street, who up to the present time have used over a hundred films. These have been exposed under very great climatic extremes, Northern Africa, Egypt, India, from the hot plains of the South to the extreme cold of the mountains on the north-west frontier, Burmah, Siam, and then the still more trying climate of the Straits Settlements. Somewhat better conditions prevailed for a while in Australia and New Zealand, but only to throw us into China and Japan in the hottest months of the whole year, and when the air was loaded with moisture almost to saturation. I am pleased to state on behalf of our outfits that they have not failed us in a single instance so far as the camera and the quality of the films are concerned. Nearly all the exposures have been developed en route, using developing powders, and under very trying conditions, in weather, water and accommodations; and while this has been done by amateurs with but limited experience, yet the results have been quite uniformly good. The dated film with its time limit seems to be an almost absolute safeguard. We have been using some, however, which are two months over time, showing but little, if any deterioration. We are all much pleased with the results obtained from the kodaks, and certainly have no reason to regret having made them a very considerable part of our photographic impedimenta.

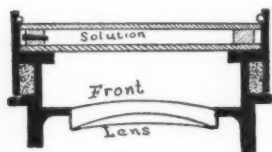
#### **The Ray Filter for Cloud and Landscape Photography.—**

The approach of autumn with its almost magical change in the coloring of forest and field, the exchange of uniform green for the gamut of reds, yellows and browns, lending just the contrast to the landscape that the summer has made us long for, brings to the photographer more strongly than ever the desire to reproduce in their natural colors, these impressive pictures.

How many of us have, after wasting numberless plates and much valuable time, given up the attempt to make anything satisfactory out

of all this wealth of opportunity! True, colors are out of the question, but an ordinary photograph, in which the colors are rendered of their correct relative value and the contrasts presented in the autumn landscape retained perfectly, can be made with no more trouble and with but a trifle more expense than the ordinary "disappointments."

It need only be remembered that the ordinary dry plate or film is but very slightly sensitive to the reds and yellows of autumn foliage, rendering both of an almost uniform "blackness," to give the key to the situation. What is needed then is an orthochromatic plate and a suitable ray filter to help the plates to do their work. Among the various forms of filters recently offered by various makers, the bichromate of potash cell in particular, lends itself to landscape work the best. The cells as now made, consist of two plates of optical glass



perfectly polished, between which is cemented a glass ring three millimeters thick, the inner surface of the ring being ground to prevent reflections and two holes being drilled about a centimeter apart through which the cell is filled or cleaned. The cell is mounted in a

nicked mounting lined with cork and slips on the hood of the lens as a cap would. With your lens equipped with this interesting apparatus, and your plate holders filled with any reliable rapid orthochromatic plates, you can seek out the favorite spots with the assurance that your negatives will show not only the beauty of the varied lights and shades, but also any clouds that may be present.

The bichromate solution in the cell strains out the blue and violet and the most actinic green rays and thus reduce the exposure of the blue sky and clouds to a harmonious level with the foliage, at the same time not increasing the exposure required beyond "snap shot," limits, exposures one-fiftieth second with an aperture of one-sixteenth developing with full time effect. The added beauty of pictures made with the ray filter, due to the perspective produced by the clouds, as well as to the presence of the clouds themselves, amply repays the extra expense of the apparatus which is, after all, very slight.

The Bausch and Lomb Optical Co., of Rochester, have recently put on the market a bichromate of potash cell as described above. The construction is indicated in the accompanying figure which is a sectional view of the cell as attached to the line hood.

**The Photographic Society of Japan.**—At an ordinary meeting of the Society, held in the rooms of the Geographical Society, Tokyo, on Friday, June 14th, Mr. K. Ogura, who had recently returned from China, where he had been official photographer to the Japanese army, during the recent war, showed some interesting results of his work. Mr. W. K. Burton showed a machine designed by Professor John Milne, F. R. S., of photographing animals—or thieves—in the dark. The slightest pull on bait attached to a thread, or the touching of a stretched cord, ignited a quantity—small or great as might be considerable—of blitz-pulver, placed alongside a camera, and anything at the point of contact was photographed.

**A Rainy Day Incident.**—"That little bill?" said the operator pleasantly, who was out on a collecting tour.

"Oh, yes, of course. Well, you need not worry about that any more; I've got things down to a system now."

"You've been a long time doing it," suggested the camera poser.

"I realize it," returned the debtor, "but it's all right now. You see \$20 is more than I can afford to let go of at any one time, but now I can get it together without missing it. You see a man never misses his small change, so I've got a little bank that I can drop it into every night. You've no idea how fast it accumulates."

"I've heard of the plan before," said the dry-plate manipulator. "If a man lives up to it and doesn't hold out on the bank it mounts up rapidly."

"Oh, I live up to it," protested the debtor. "I put every cent of small change into it every night, and it's all for you."

"I may hope then—"

"My dear sir, you may more than hope. The system makes the payment in full an absolute certainty. It overcomes all obstacles, and it is only a question of time—"

"How much time?"

"Well, that's rather difficult to say. You see the amount of small change varies, and—"

"What do you call small change?"

"Pennies. I—. What's that? Oh, well, sue if you want to. That's what a man gets for trying to do the right thing."

**Flashlight Wonders.**—Naturalists have been doing some clever things by the aid of photography. A Western sportsman has been for years making a collection of photographs of all kinds of wild animals in their native haunts, and many of these pictures, especially of ani-

imals about to spring at their intended prey, have been taken under conditions that made the skillful handling of the rifle highly necessary the instant after the camera was snapped. Another enthusiast has devoted himself to photographing the animals of the forest in their nightly wanderings. He would set a wire in the path of the animal he wished to photograph and adjust the camera so that as the animal came along and made contact with the wire blitz-pulver was ignited, and in the flash the picture was taken. In this way some beautiful specimens of deer in all sorts of attitudes, of mountain lion, badgers, opossums, etc., have been secured, and many new features have been developed of great interest to the naturalist. M. Bontan, the European naturalist, who studies the wild life of the Mediterranean in the garb of a diver, has succeeded in taking some photographs of the sea bottom. He uses a flashlight obtained from a spirit lamp and magnesium powder, which is covered by a water-tight bell jar. The lamp stands on a barrel containing oxygen gas, which he employs to work the lamp and the pneumatic shutter of the camera. He breathes through the supply pipe of the diving dress. The camera is water-tight and stands on a tripod near the barrel, so that the shutter and the flashlight can be worked together.

**The** November number of *The Delineator* is called the Thanksgiving number, and illustrates a bewildering wealth of Autumn and Winter fashions, the collection of stylish and becoming Garments being particularly complete. A novel departure in Millinery is noted, and the colors and combinations in the Season's Dress Goods and the glint and glitter of their spangled and jewelled trimmings are attractively described. Mrs. Roger A. Pryor furnishes a gossip and circumstantial account of Dinner Giving in Society, and Juliet Corson writes interestingly on Domestic Service as an Employment. The best kind of Thanksgiving Dinner is described, with receipts for all its dishes; and a timely article on Carving tells just how to gracefully dismember the noble bird that occupies the place of honor in the menu given.

Helen Marshall North details the varied industrial instruction to be had at Pratt Institute, Brooklyn. Both children and adults will be delighted to learn just how the crepe-paper Brownies are made, and with the pictures of these amusing little figures. Harriet Keith Fobes shows how burnt work decorations may be applied to friezes, portieres and furniture, and Sarah Miller Kirby describes and defends Froebel's Own Manual of Kindergarten Work.

## Photographic Hints and Formulæ.

**Purple Transparencies.**—Adolf Hertzka, in the *Photographische Mittheilungen*, gives the following method of development, which, he says, will yield constantly regular purple tones. The plate (which should be exposed about the same time as for hydroquinone) is first bathed, for about half a minute, in the following solution :

Glycin . . . . .	15 grains.
Carb. potash . . . . .	2 drams.
Bromide potassium . . . . .	8 grains.
Water . . . . .	8 ozs.

After about half a minute, and before the image appears, about half the quantity of the following solution is added to the first :

Soda sulphite . . . . .	2¼ ozs.
Pyro . . . . .	3½ drams.
Water . . . . .	12 ozs.
Sulphurous acid . . . . .	5 drops.

when the picture appears at once with great strength and clearness. It is not recommended to mix the solutions before commencing, as in this case the result is not good. The developed positive is washed under the tap and fixed in the acid bath. The tone is purple, like a print well toned with gold, and remains regular for a series of slides.

**Oil Spots on Paper.**—To remove oil stains from the pages of a book without destroying the printing, gently warm the stained parts with a hot flat-iron (so as to take out as much of the oil as possible) on blotting paper, then dip a brush into rectified spirits of turpentine, and draw it gently over the sides of the paper, which must be kept warm during the whole process. Repeat the operation as many times as the thickness of the paper may require. When the oil is entirely removed, to restore the paper to its usual whiteness, dip another brush in highly rectified spirits of wine, and draw it in like manner over the stained place, particularly round the edges. By adopting this plan the spots will entirely vanish and the paper assume its ordinary whiteness.

**To Clean Frosted (Dead) Silver Ornaments.**—Dissolve a lump of soda in a saucepan of boiling water, and place them in it, and leave them for a few minutes ; add a small piece of yellow soap, and rub the articles while in a boiling state with a soft tooth brush. When taken out, place them in a hot oven on a brick until the desired effect be produced.

**A Simple Water Test.**—A simple test for the sewage contamination of water, recommended by the Iowa Board of Health, is to add four drops of permanganate of potash solution to a glass of the water. After standing two hours, the rose color imparted by the permanganate will have changed to a dull yellow if decomposing organic matter is present in a dangerous amount, and completely disappear in time if the decomposed organic matter is in very large quantity. If the proportion of impurity is small, the rose color may fade only slightly. A good method of quickly determining the quality of drinking water is to dissolve 12 grains of caustic potash and three grains of permanganate in an ounce of distilled water, and add one or two drops of this solution to a glass of the water. If a decided color is imparted, the water may be used, but it should be rejected as probably dangerous if the color immediately disappears.

**A gold colored surface on brass** may be produced with a liquid prepared by boiling together for about fifteen minutes, four parts of caustic soda, four parts of milk sugar, and one hundred parts of water, to which four parts of a concentrated solution of sulphate of copper should then be added with constant stirring. The mixture is then cooled to 67 degrees Fah., and the well cleansed articles are immersed in it for a short time, when the gold color will appear. A longer immersion results in the formation of a bluish green tint, and a still more prolonged action causes the formation of iridescent colors.

**A New Glue.**—According to a high German authority, a new and excellent liquid glue is made by dissolving gelatine in a solution of chloral hydrate in water. For general purposes ordinary glue may be used instead of the more expensive gelatine. This cement is said to dry quickly, to have great adhesiveness and to remain unchanged indefinitely.

**Paste.**—The chief point in making paste is that the water boils. Mix the flour with cold water first, and then pour the boiling water on it, continuing the mixing. Put it into the saucepan, stirring it all the time until it has boiled a minute or so. If you wish to keep it, add alum.

**To perfume note paper,** wet blotting paper with perfume, dry it by placing a weight upon it, then lay it between the sheets of writing paper and top it with a heavy weight. Very soon the paper will absorb the aroma.

### Photographic Scissors and Paste.

**In a recent** article on "The Age of Niagara Falls," Mr. J. W. Spencer, having measured the recession of forty-eight years, estimates the age of the falls at 31,000 years, the river at 32,000, and says that the Huron drainage has been turned from the Ottawa River into Lake Erie less than 8,000 years. These estimates are lower than those ordinarily given.

**Something About Eggs.**—An egg is in three parts—the shell, the white, and the yolk. The relative weight of these is: Shell and lining material, 106.9; albumen, 604.2; yolk, 288.9. One-half of the egg is nutriment, whereas meat is rated at best as only one-fourth. Thus one pound of egg is equal in nutritive value to two pounds of meat. The fresh egg is living food. Its nutritive qualities are in perfection and its component parts exactly balanced. As soon as laid a change begins. The moisture is reduced by evaporation through the ducts of the shell, and air is absorbed. The vitality decreases gradually, unless, by external warmth the process is hastened; finally death ensues and putrefaction follows. Eggs may be kept apparently fresh a long time if taken when freshly laid and the pores of the shell hermetically sealed by rubbing with sweet oil, or by dipping for an instant in boiling water. Infertile eggs, where the material for the structure and support of life are present but the vitality has not been added, will keep longest, and, in the end, do not putrefy, but simply become dried.

**Relative Energy of the Spectrum Rays.**—At the Berlin Physical Society Professor King spoke on the experiments which, in conjunction with Dr. Rubens, he had made on the distribution of energy in the spectrum of a triplex burner. Dealing with great detail on all the points involved to obtain exact results, he said they found that the energy of the extreme red was more than a thousand times that of the blue, and even in an amyl-acetate lamp the energy was three hundred times greater.

**Misunderstood.**—Fond mother: What does it cost to have my baby photographed? Photographer: Six shillings, madam, but I make a reduction on a dozen. Fond mother: Don't be rude, sir; this is my first. Photographer: I mean, madam — [She leaves the shop in a temper.]—*Fliegende Blätter*.

**Among the** display of old paintings at Macbeth's gallery in New York is a Murillo, valued at \$200,000, and a beautiful Titian, at \$100,000.

**Letters by Bicycle.**—A young man named Bennett has put his bicycle to profitable use in the Australian gold fields by establishing with it a postal route between Coolgardie, the centre of the mining district, and Dundos, which is 280 miles away. Strapped on the wheel is a small letter-box in which he carries letters between the two towns for a shilling apiece, and telegrams for five shillings, making one round trip a week. A revolver, a sharp knife, and a water bottle comprise the rest of the outfit.

**The Bo'sun Explains.**—A little time ago, on one of the Cunard boats, one of the crew (while the passengers were at dinner) picked up a menu, and, seeing on the top "Table d'hôte," inquired of one of his mates the meaning of it. "What does this 'ere mean, Joe?" Joe, taking the menu, gazed on it with a puzzled air, scratched his head, and said: "I can't make nothing of it. Let's go to old Coffin; he's a scholard and sure to know." On giving the menu to the boat-swain, he thoughtfully stroked his chin and said: "Well, look 'ere, mates; it's like this 'ere: Them swells down in the saloon haves some soup, a bit of fish, a bit of this, and a bit of that, and a bit of summat else, and calls it table dottie. We haves table dottie, only we mixes it altogether and calls it Irish stew."

**Both Were Disappointed.**—An unknown man from Rochelle, Ill., and Mrs. J. A. Freeman, of Scranton, Pa., arrived lately in Chicago by agreement arrived at through a matrimonial bureau. Mrs. Freeman is forty-five years old and a divorcee. Letters, photographs and promises were interchanged, and accordingly they met at the Auditorium Hotel.

Mrs. Freeman took a good long look at him and asked him whose photograph it was he had sent her. "I thought you were handsome," she said, in surprise.

"Well, that's what I thought of you," he retorted, "judging from the picture."

The man asked her if she had any money. She said no. He said he was similarly situated. She told him then he had no charms for her. Without the least show of gallantry he told her she had no advantage of him, and fled. Mrs. Freeman has left for her home.

**Photographic Kite Experiments.**—Out at the observatory at Blue Hill the kite flyers found that the high wind, which blew during the forenoon at the rate of from thirty-five to forty miles an hour, was likely to give them considerable difficulty in making their experiments. W. A. Eddy, who is the chief experimenter, and who comes from New Jersey to make use of the better air of New England in his trials, sent up two kites at about 9 o'clock, but the wind speedily banged them around so roughly that they were disabled. They were repaired, and were again sent aloft. They made their way upward in a southeasterly direction from the hilltop, and Mr. Eddy planned, if the wind offered no further resistance, to get a photograph of the observatory from a point high in the air toward the southeast. Subsequent experiments were pretty satisfactory. The wind did not start up until nearly 11 o'clock in the forenoon, but then Mr. Eddy sent up several kites, and by afternoon he had a string of four in the air, the highest of which was rather more than 875 feet above sea level, or 255 above the level of the hilltop. A camera was suspended from one of the kites, and by its agency a photograph of the country toward Boston and Boston Light was taken. The view is expected to be thoroughly good, and will be equivalent to a bird's-eye view from a hill 200 feet higher than the Blue Hill. A thermograph was sent up at 5 o'clock, and it reached an altitude of 1340 feet above sea level, or 740 feet above the level of the hilltop. The instrument showed the temperature of the air aloft to be three degrees cooler than that on the hilltop, and the barometer fell seven-tenths of an inch to correspond with the rise of 700 feet. Mr. Eddy thinks he can send his kites as high as 1000 feet above the hilltop without difficulty, if the wind will only give an even chance.

**The Laws of Health.**—The true secret of health and long life, according to a medical journal, lies in very simple things.

Court the fresh air day and night. "Oh, if you knew what was in the air!"

Sleep and rest abundantly. Sleep is nature's benediction. "Work like a man; but don't be worked to death."

Avoid passion and excitement. A moment's anger may be fatal.

Associate with healthy people. Health is contagious as well as disease.

Don't carry the whole world on your shoulders, far less the universe. Trust the Eternal.

Never despair. "Lost hope is a fatal disease."

## In the Twilight Hour.

FRUITFUL branches bend low.

It is never hard to believe when we get on believing ground.

DOUGLAS Jerrold says, "She who rocks the cradle rules the world."

THE man who enters the straight gate has to leave behind him all that is crooked

To be a man in a true sense is, in the first place, and above all things, to have a wife.—*Michelet*.

JOHN QUINCY ADAMS uttered words to which many noble hearts can respond, when he said: "All I am, or ever have been, in this world, I owe, under God, to my mother."

NO money is better spent than what is laid out for domestic satisfaction. A man is pleased that his wife is dressed as well as other people, and the wife is pleased that she is dressed.—*Johnson*.

SOME one has said, "Not all the learning of all the universities of Europe can compensate for the loss of that which the youth reared in a religious home has learned in childhood at his mother's knee."

It is folly to pretend that one ever wholly recovers from a disappointed passion. Such wounds always leave a scar. There are faces I can never look upon without emotion; there are names I can never hear spoken without almost starting.—*Longfellow*.

WHAT power there is in a true mother's life and example—and how many grateful testimonies have been recorded by noble men and women of the purifying and ennobling effects of a mother's love and influence upon their lives. How limitless are her possibilities, how immense her responsibilities.

Some shepherds try hardest to feed the fattest sheep.—*Ram's Horn*.

It is easy to tell how everybody except yourself may succeed.

TARES hold their heads high because there is nothing in them.

GIVE men mountain-moving faith without love, and every mountain would be standing in the wrong place.—*Ram's Horn*

A MAN who does not know how to learn from his mistakes turns the best schoolmaster out of his life.—*Henry Ward Beecher*.

EVERYONE is looking for happiness, but no one finds it where he looks. The surest way to find happiness is to look for other people's happiness.

THE human race is divided into two classes, those who go ahead and do something, and those who sit still and inquire why it was not done the other way.—*Holmes*.

"DON'T you ever take wine?" said a hospitable man to a friend, before whom he pushed the Madeira. "Are you afraid of it?" "No," replied his wiser friend "I am afraid of the example."

A TEXT for the chronic grumbler: "Do all things without murmurings and disputings." It would be a terrible cross for you, but then, think of what a sense of relief and rest would come to us all, and we need it.

THE highest wages in the world are earned by good mothers. The mother who does an honest day's work, week in and week out, in faithful and faith-filled care of her children, is on a large salary, and she will be rich sooner or later.—*H. C. Trumbull*.

**BARGAIN LIST.—NOV., 1895.**

**PORTRAIT CAMERAS.**

[For Lenses see Special List.]

1—11x14 Portrait Camera, with 8x10 attachment, . . .	\$60 00
1—14x17 D. S. B. Portrait Camera, . . .	40 00
1—5x7 Victoria Camera, 4 $\frac{1}{4}$ -lenses, . . . . .	18 00
1—5x7 Victoria Camera, . . . . .	8 00
1—5x7 Victoria Camera, . . . . .	9 00
1—5x8 Stamp Camera . . . . .	15 00
1—5x8 Wet Plate Stereo. Camera, 3 holders, . . . . .	20 00
1—14x17 Portrait, 2 holders, . . .	20 00

**VIEW CAMERAS.**

1—5x8 Genessee Outfit, 3 extra holders . . . . .	13 00
1—8x10 W. P. A. View Camera and 1 extra holder . . . . .	10 00
6— $\frac{5}{8}$ Scovill light-weight film holders, each . . . . .	1 00
1—4x5 Universal Camera, 3 holders, focal plane shutter, Orthoscope lens . . . . .	30 00
1—8x10 New Model Camera, 6 holders, lens and tripod . . .	18 00
1—Takiv Magazine Camera, . . .	2 50
1—Peep-a-Boo Camera, . . . . .	2 50
1—5x8 Blair Camera, with 6 $\frac{1}{2}$ x8 $\frac{1}{2}$ extension and 12 holders, . .	25 00
1—4 $\frac{1}{4}$ x5 $\frac{1}{2}$ Blair Rev. Back Camera, 6 holders and case, . .	22 50
1—6 $\frac{1}{2}$ x8 $\frac{1}{2}$ View and 2 holders . .	8 00
1—4x5 New Model Improved Camera, 3 holders, . . . . .	11 90
1—5x8 New Model Camera, . . .	10 00
1—6 $\frac{1}{2}$ x8 $\frac{1}{2}$ Novelette Camera, new, . . . . .	20 00
1—5x8 Blair Single Swing View Camera . . . . .	15 00
1—6 $\frac{1}{2}$ x8 $\frac{1}{2}$ American Optical Co.'s View Camera, . . . . .	20 00
1—5x7 Blair Rev. Back Camera, new . . . . .	25 00
1—5x8 Boston Rev. Back Camera, new . . . . .	25 00
1— $\frac{1}{4}$ Eclipse Outfit, . . . . .	2 00
1—5x8 '76 Camera, Holder, Tripod, and Case, . . . . .	23 00
1—5x7 View Camera, . . . . .	7 00
1—5x8 Blair Rev. Back Camera, and 4 holders, . . . . .	25 00
1—Student Camera, complete . .	1 50
1—5x7 New Model Improved and 3 holders and case, . . . . .	11 00

1—14x17 Ideal Camera, holder, tripod, Orthoscope lens and case, . . . . .	100 00
Without lens, . . . . .	40 00

**HAND CAMERAS.**

1—No. 1 Kodak, . . . . .	10 00
1—A Ordinary Kodak, new, . . .	5 00
1—5x7 Folding Kodak, new, . . .	50 00
1—4x5 Climax Detective, new, . .	18 00
1—4x5 Turnover Detective, new, .	15 00
1—4x5 Montauk Detective, new, .	18 00
1—4x5 Hawkeye " . . . . .	6 00

**ACCESSORIES.**

1—Anthony's Electric Retoucher, .	15 00
1—Iron Centre Camera Stand, . .	2 00
1—Seavey Balustrade . . . . .	10 00
1—Seavey Vase . . . . .	2 00
10—6 $\frac{1}{2}$ x 8 $\frac{1}{2}$ Printing Frames each, . . . . .	35 00
1—14-in. Drag Burnisher, . . . .	5 00
3 $\frac{1}{4}$ x4 $\frac{1}{4}$ Washing Boxes, each, . .	50 00
1—8 ft. Show Case . . . . .	12 00
2—Large Oak Show Frames, each .	5 00
1—8x10 Knickerbocker Stand, . .	4 00
1—Corner Chair, Velvet, list \$20, .	10 00
1—Cooper Enlarging Bromide Lantern, 8 in condenser . . . . .	35 00
1—11-in. Acme Burnisher, . . . .	12 00
1—14-in. Eureka Burnisher, . . .	15 00
1—15-in. Improved Eureka Burnisher . . . . .	25 00
1—15-in. Acme Rotary Burnisher, .	20 00
1—Acme Print Trimmer, new, . .	10 80
1—Baldwin Print Cutter, new, . .	12 00
Lot of Picture Mats. Write for particulars.	
1—14x17 Printing Frame, . . . .	1 25
1—18x22 Printing Frame, . . . .	2 50
1—11x14 Printing Frame, . . . .	1 00
1—8x10 Printing Frame, . . . . .	40 00
1—14x17 Adaptable Washing Box .	4 50
2—6x8 Children's Backgrounds, .	3 00 and 4 00
2—8x10 Bryant Backgrounds, . .	6 00 and 7 00
1—Wall Accessory, . . . . .	4 00
1—Daisy Foreground, . . . . .	4 00
1—Seavey Swiss Cottage . . . . .	8 00
1—Osborne's Rock Accessory, . .	10 00
1—Osborne's Pillar Accessory . .	15 00
Lot of second-hand backgrounds, 8x10 and 6x8, \$3.00 to \$6.00; write for particulars.	
Peerless Varnish Pots, each . . .	40 00
Full line of Packard Brothers' Grounds in stock. Interiors \$5.00; exteriors, \$4.00.	
3—Junior Ruby Lamps, each, . .	60 00

1-4¼x5½ Negative Box . . . .	35	1-6½x8½ Gundlach and Shutter, . . . .	50 00
1-Walmsley Reversible Finder . . . .	2 50	1-5x8 Orthoscope 20-A, . . . .	7 50
1-Card-size Burnisher . . . . .	3 00	1-Extra 4x4 Harrison Portrait, . . . .	30 00
1-Magic Camera Stand, . . . . .	7 00	1-¼ H B and H Lens, . . . . .	3 00
1-22x28 Moorehouse Display		1-3 B Dallmeyer lens for cabi-	
Album, . . . . .	10 80	nets, . . . . .	\$130 00
1-Williams Flash Lamp, . . . . .	75 00	1-½-Size Dallmeyer lens for	
2-Air Brushes, complete, good		cabinets, . . . . .	50 00
as new, each . . . . .	25 00	1-5x7 Euryscope Lens, Prosch	
<b>Bargains in Lenses.</b>			
1-8x10 Bausch & Lomb Rapid		Shutter, . . . . .	35 00
Universal Lens,		1-6½x8½ Gundlach Single Lens	3 50
With B. & L. Shutter . . . . .	37 00	1-5x8 Gundlach Star Lens, . . . .	12 00
Without Shutter . . . . .	30 00	1-11x14 Darlot R. H. Lens, list	
1-8x10 Steinheil Anti-planatic		\$45, . . . . .	30 00
Lens; list \$50 . . . . .	38 00	1-5x8 Darlot R. H. Lens, . . . .	15 00
1-8x10 S.W series Voigtlander		2-4x5 Darlot R. H. Lens, each	10 00
Wide Angle Lens; list \$65.50	45 00	1-10x12 Blair Orthographic, . . . .	20 00
1 Set ¼ size Lenses . . . . .	9 00	1-5x8 Wide Angle Lens, . . . . .	5 00
1 Set 1-9 size Lenses . . . . .	15 00	2-6½x8½ Wide Angle Lens, ea.	8 00
1-½ size Voigtlander Portrait . . . .	25 00	1-11x14 Wide Angle Lens, . . . .	18 00
1-6½x8½ LeClaire Lens, . . . . .	12 00	1-Pair Waterbury Stereo Lenses, . . . .	4 50
1-¼-Size Portrait Lens, . . . . .	4 00	2-R. R. Detective Camera Lens, . . . .	3 00
1-¼ Voigtlander Lens, . . . . .	9 00	1-Set 1-9 Gem Lenses, . . . . .	16 00
1-8x10 Orthoscope and Shutter, . . . .	30 00	1-¼ Gem Lens, . . . . .	1 50
1-8x10 Eagle R. R. . . . .	20 00	1-4-4 Jamin Globe Lens, . . . . .	12 00
1-16x20 Darlot 20-A . . . . .	35 00	1-¼ Holmes, Booth & Hayden, . . . .	4 00
		1-6½x8½ E. A. Single Lens, . . . . .	5 00
		1-5x8 Single View Lens, . . . . .	2 00
		1-6½x8½ R.O. Co's. View Lens, . . . .	2 00

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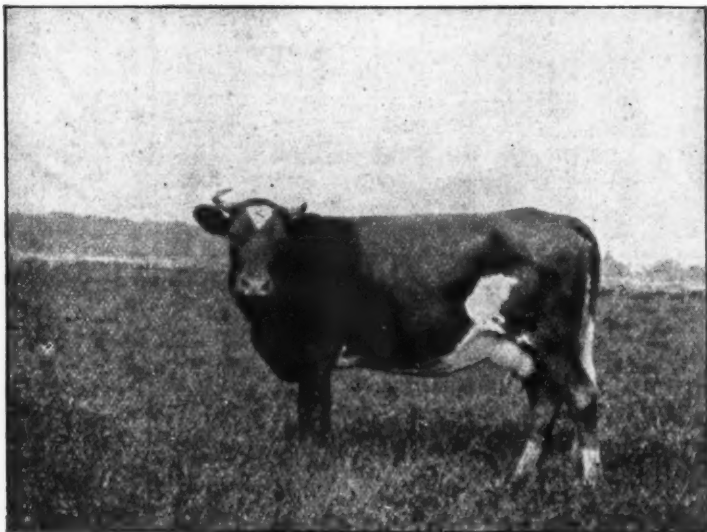
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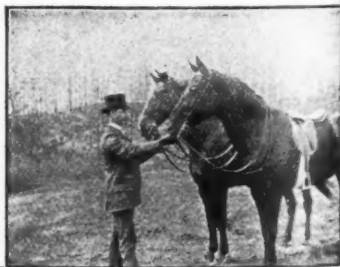
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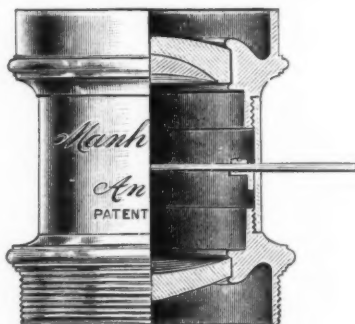
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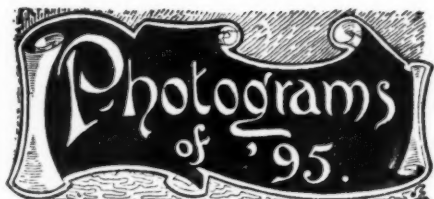
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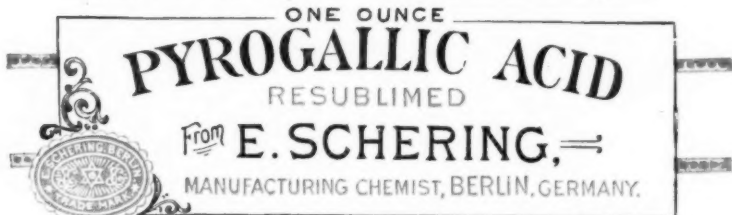
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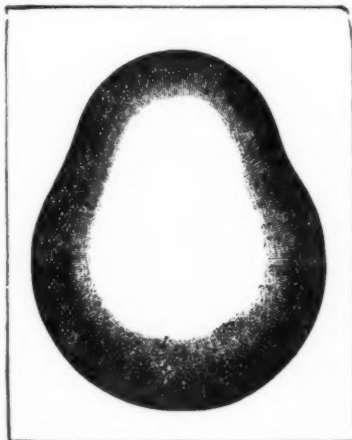
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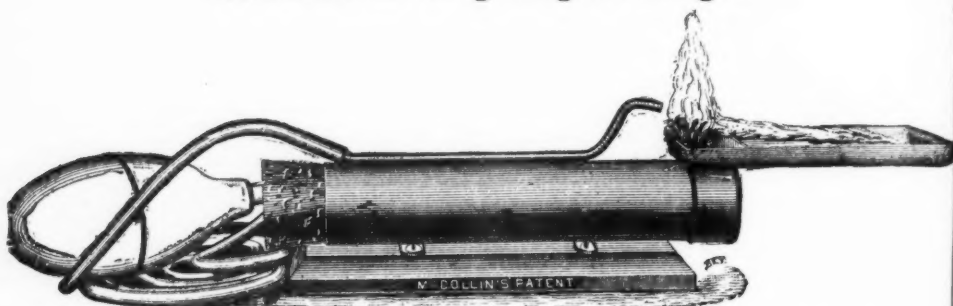
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6½ x 8½ . . . . .	56
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Send for a sample print.

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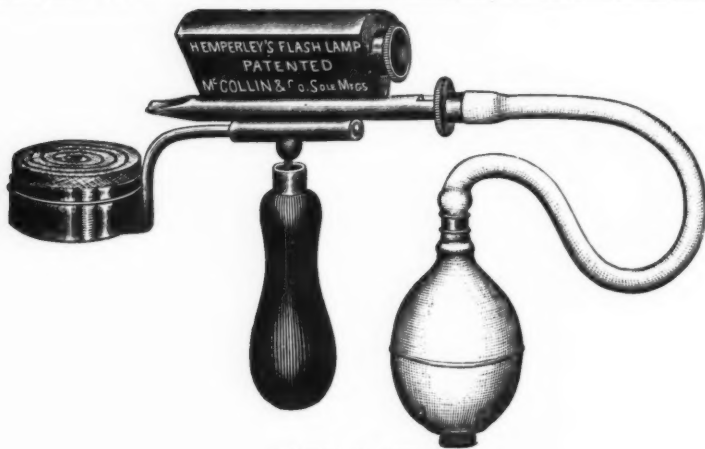
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Each lamp is supplied with a patent rubber bulb, *with a valve*, which prevents any of the powder being drawn back in the hose or bulb, and in time clogging the air passage.

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**Magnesium, Fine Ground, per oz., .40**

All parties are notified that we control the Patents under which this Lamp is manufactured, and propose to protect ourselves against all infringements.

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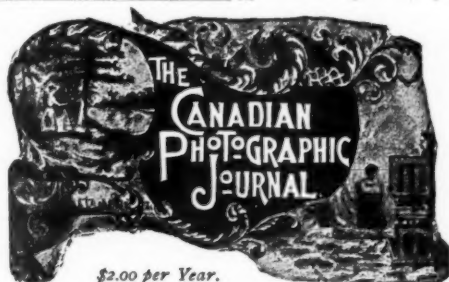
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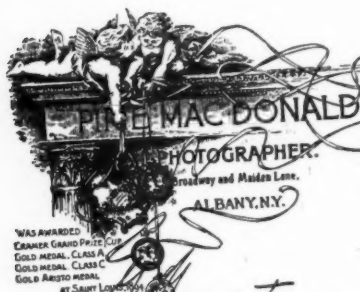
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April 16<sup>th</sup> 1895

J. J. J. J.  
24 & 26 E. 3<sup>rd</sup> St. N.Y.

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Yrs. the negatives that were for me the  
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Very truly  
Yours  
Pine Macdonald

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Lightning Storage Lamp,	-	\$4.50	} The "Lightning," the well-known Prosch Storage Lamp, and the "Professional," like it, but twice its size. Used by most prominent professionals. Always give satisfaction.
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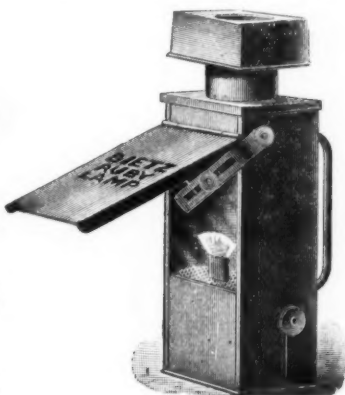
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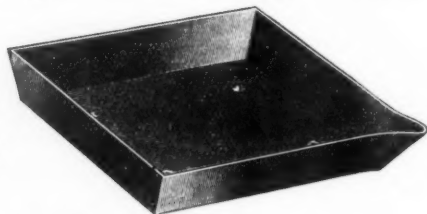
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## ELKHART, IND,

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The Acme Cycle Company is a concern we can heartily recommend as composed of people of sterling worth, their general business running up into the millions each year, the bicycle department being only a portion of it.

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Best Advertising Medium in Marshall Co.

FRANKFORT, KAN., March 8, 1895.

Mr. Ed. Mitchell, *Morris, Ills.*

DEAR SIR:—In reply to your request as to my opinion of the Acme Bicycles will say: I have been in the bicycle business for the past four years, and have made the bicycle somewhat of a study. I have had for my own use during that period five different wheels, and can honestly say that the Acme wheels are the best constructed, finest finished, and in general the best wheels on the market to-day for the price. I have had some dealings with the Acme people, and can say you will find them nice people to deal with, and their wheels just as represented in every particular. In short, my advice to you is buy an Acme every time.

Respectfully yours,  
FRANK D. BLISS.

OFFICIAL PAPER OF BAYFIELD COUNTY.

FRED. T. YATES, EDITOR AND MANAGER

#### THE WASHBURN NEWS.

WASHBURN, WIS., March 8, 1895.

Acme Cycle Co., *Elkhart, Ind.*

DEAR SIR:—I am in receipt of your letter of recent date, regarding advertising for this year. The wheel I got of you last year proved more than satisfactory. It received particularly hard usage but stood the test well. I now want one of your 22 pound wheels. Have you this in stock. An early answer will oblige,

Yours truly,  
FRED. YATES.

#### THE QUICK PRINT

WILCOX BROS., Props.,  
P. O. Box 505. Spokane, Wash.

March 6, 1895.

Acme Cycle Co., *Elkhart, Ind.*

GENTLEMEN:—The wheel I bought of you last July has given me the best of service almost constantly since and has been running alongside of \$125 Rambler with less repairs and breaks of any and all kinds. However, I desire a new wheel this spring. What have you to offer?

Very truly yours,  
W. B. WILCOX,  
Spokane, Wash.

#### THE TRANSCRIPT.

Editorial Office.

A. P. HOUGH.

TRAVERSE CITY, MICH., MARCH 8, '95

Acme Cycle Co., *Elkhart, Ind.*

DEAR SIR:—The Light Roadster arrived yesterday, and your letter just now. Everything is entirely satisfactory, and the wheel will be paid for to-day. Electro has not arrived yet, but will be inserted in this week's issue if received to-day. If not will have to go over till next week. I appreciate your prompt and courteous treatment, and will endeavor to satisfy you as well as you have me.

Yours truly,  
A. P. HOUGH.



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Men**

to distribute our advertisements in part payment for a high grade Acme bicycle, which we send them on approval. No work done until the bicycle arrives and proves satisfactory.

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**ACME CYCLE COMPANY,  
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PATENTED.

Used with Blitz Pulver.

**FOR PORTRAITS, LARGE GROUPS, INTERIORS AND  
STAGE EFFECTS.**

Takes the place of daylight on dull days, takes the place of a skylight on bright days.

As manufacturers of Blitz Pulver, which is used by all manufacturers of Professional Flash Machines, we feel that we are in a position to know what photographers want.

We believe FLASH LIGHT WORK HAS COME TO STAY, and after careful experimentation, we have produced a lamp which combines SIMPLICITY, ECONOMY AND EFFICIENCY. We invite correspondence from photographers, and will publish from time to time samples of the work of the machine in this journal.

This machine requires no gas or gasoline,—burns alcohol,—and is used with Blitz Pulver exclusively. The cut will show its construction.

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MANUFACTURERS AND PATENTEES,

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## Blitz-Pulver

## Blitz-Pulver

Has a record for flash-light work which is unapproached. No other powder in the United States can show the indorsements of every individual manufacturer of professional flash-lamp which are successfully on the market. Read what they say of it, and then judge. Do not deceive yourself. Flash-light work has come to stay.

ST. JOSEPH, Mo., October 6, 1894.

*Thos. H. McCollin & Co.*

*Messrs.:*—In regard to your inquiry I will say, I advise the use of "Blitz Pulver" with our machine, and I have used no other powder in getting out our sample negatives. It operates in our machine with unvarying success.

Very respectfully yours,

L. G. BIGELOW.

BRIDGEPORT, CONN., October 17, 1894.

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*Gentlemen:*—We have tried various compounds for flash light powders now on the market, but yours gives the best satisfaction with our machine.

Yours truly,

FAIRCHILD FLASH LIGHT CONCERN.

SAN FRANCISCO, CAL., February 16, 1894.

*Gentlemen:*—In regard to Blitz Pulver we have always recommended your powder, and our instructions call for it and no other. It is the best powder we have ever used.

[Signed]

WILLIAMS & SHEPARD,  
Manufacturers Williams Flash Machine.

CORTLAND, N. Y., October 8, 1894.

*Thos. H. McCollin & Co., Philadelphia.*

*Gentlemen:*—Will say in regard to "Blitz Pulver" that it is the only flash powder of which we have any knowledge that can be relied upon at all times. We send it out and advise its use with the *Westcott Flash Machine*. When used with this machine it produces beautiful results and with very little smoke.

Respectfully,

WESTCOTT & LEWIS.

MUSCATINE, IA., October 5, 1894.

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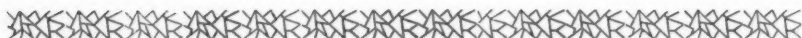
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